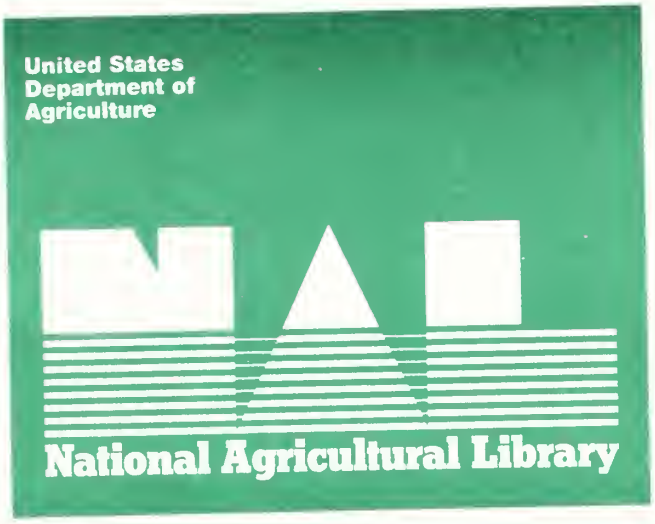
Nutrition Management of the Pregnant Adolescent

A Practical Reference Guide

Edited by Mary Story, Ph.D., R.D.

March of Dimes Birth Defects Foundation • U.S. Department of Health and Human Services • U.S. Department of Agriculture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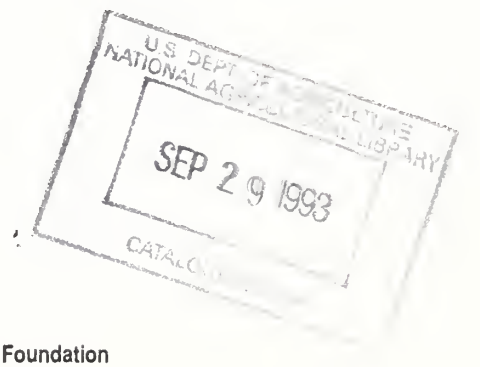

March of Dimes Birth Defects Foundation
1275 Mamaroneck Avenue
White Plains, New York 10605

U.S. Department of Health and Human Services
Public Health Service
Bureau of Maternal and Child Health and Resources Development
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Food and Nutrition Service
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PREFACE

Nutrition Management of the Pregnant Adolescent: A Practical Reference Guide, is the latest in a series of resources on the topic of nutrition and adolescent pregnancy developed through the joint efforts of the Department of Health and Human Services, the U.S. Department of Agriculture, and the March of Dimes Birth Defects Foundation. This manual is written for those health care providers and educators involved in the care of pregnant adolescents, including nurses, midwives, nutritionists, physicians and educators. The overall goal of this manual is to improve the health and nutritional status of pregnant teenagers and thus promote a healthy pregnancy outcome. The manual focuses on clinical application of current knowledge emphasizing assessment, counseling approaches and strategies to promote dietary change and adequate weight gain. Topics are presented in a format that outlines and highlights subjects for easy reference. Selection of subject areas and format were made by a multidisciplinary planning committee. First drafts of each chapter were reviewed and critiqued by at least four members of the planning committee. It should be noted that statements and opinions in each chapter are those of the author and do not necessarily represent those of the U.S. Department of Health and Human Services, U.S. Department of Agriculture or March of Dimes.

Teenage pregnancy continues to be one of the major public health problems in the U.S. and is associated with significant medical and nutritional risk. Nutritional status is considered to be one of the most important environmental factors affecting the health of the teenage mother and her fetus. An adolescent's nutrition and weight status and lifestyle habits at conception and during gestation profoundly influence pregnancy outcome. Because of this, adolescents require nutrition intervention early and throughout the duration of their pregnancy. Working with adolescents is exciting, challenging and sometimes difficult and frustrating. Pregnant teenagers pose a different challenge than working with pregnant adult women and require not only an understanding of the developmental issues of youth but counseling approaches geared for adolescents. This manual is dedicated to helping the health care provider meet the challenge of improving the health and nutritional status of pregnant adolescents and thus promoting a healthy pregnancy outcome for mothers and their infants.

Mary Story, Ph.D., R.D.
Laura McNally Kruse, M.P.H., R.D.

PLANNING COMMITTEE

Promise Ahlstrom, M.D.
Adolescent Medicine Division
Children's Hospital National Medical Center
Washington, D.C.

Lolita Albers
Assistant Director
Professional Services Department
March of Dimes Birth Defects Foundation
White Plains, New York

Irene Alton, M.S., R.D.
Chief Nutritionist
Health Start, Inc.
St. Paul, Minnesota

Elizabeth Brannon, M.S., R.D.
Director, MCH Training
Bureau of Maternal and Child Health and Resources Development
U.S. Department of Health and Human Services
Rockville, Maryland

Joann Gephart, R.N., M.S.N.
Nurse Consultant
Bureau of Maternal and Child Health and Resources Development
U.S. Department of Health and Human Services
Rockville, Maryland

Elizabeth Gong, M.P.H., M.S., R.D.

Currently
Cooperative Extension
University of California
Oakland, California

Formerly
Adolescent Health Training Program
University of Maryland
Baltimore, Maryland

Linda Juszczak, R.N., P.N.P
Clinic Director
Far Rockaway High School Clinic and Senior Teaching Associate
Cornell Medical School
Division of Adolescent Medicine
North Shore University Hospital
Manhasset, New York

Laura McNally Kruse, M.P.H., R.D.
Nutrition Specialist
Bureau of Maternal and Child Health and Resources Development
U.S. Department of Health and Human Services
Rockville, Maryland

Brenda Lisi, M.S., R.D.
Nutritionist
Nutrition and Technical Services Division
Food and Nutrition Service
U.S. Department of Agriculture
Alexandria, Virginia

Kristi Mulchahey, M.D.
Assistant Professor
Department of OB-GYN
University of Alabama
Birmingham, Alabama

Jane Rees, M.S., R.D.
Director, Nutrition Services and Training
Division of Adolescent Medicine
University of Washington
Seattle, Washington

Bonnie Spear, M.S., R.D.
Assistant Professor and Director of Nutrition
Division of Adolescent Medicine
University of Alabama
Birmingham, Alabama

Mary Story, Ph.D., R.D.
Assistant Professor
School of Public Health
Nutrition Director
Adolescent Health Program
University of Minnesota
Minneapolis, Minnesota

CONTRIBUTING AUTHORS

Lucy B. Adams, M.S.
Chief Nutritionist
Division of Adolescent Medicine
Department of Pediatrics
University of California
San Francisco, California

Promise Alstrom, M.D.
Adolescent Medicine Division
Children's Hospital National Medical Center
Washington, D.C.

Irene Alton, M.S., R.D.
Chief Nutritionist
Health Start, Inc.
St. Paul, Minnesota

Patricia Faulkner, M.S., R.D.
Staff Nutritionist
Adolescent Health Training Program
University of Minnesota
Minneapolis, Minnesota

Elizabeth Gong, M.P.H., M.S., R.D.
Currently
Cooperative Extension
University of California
Oakland, California
Formerly
Adolescent Health Training Program
University of Maryland
Baltimore, Maryland

Linda Juszczak, R.N., P.N.P
Clinic Director
Far Rockaway High School Clinic and
Senior Teaching Associate
Cornell Medical School
Division of Adolescent Medicine
North Shore University Hospital
Manhasset, New York

Corinne Malecha, M.P.H., R.D.
Adolescent Health Nutrition Fellow
Adolescent Health Training Program
University of Minnesota
Minneapolis, Minnesota

Kristi Mulchahey, M.D.
Assistant Professor
Department of OB-GYN
University of Alabama
Birmingham, Alabama

Susan Reynolds, M.S.W.
Adolescent Health Program
University of Minnesota
Minneapolis, Minnesota

Bonnie Spear, M.S., R.D.
Assistant Professor and
Director of Nutrition
Division of Adolescent Medicine
University of Alabama
Birmingham, Alabama

Mary Story, Ph.D., R.D.
Assistant Professor
School of Public Health
Nutrition Director
Adolescent Health Program
University of Minnesota
Minneapolis, Minnesota

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A multidisciplinary planning committee (see page iv) convened in 1987 for a one-day meeting to define the purpose and content of the manual. All of the committee members reviewed and critiqued earlier drafts of selected chapters. A special thanks goes to each of them for their time, expertise and commitment to this project. Also greatly appreciated are the efforts of Jane Rees, M.S., R.D. and Mariel Caldwell, M.S., M.P.H., R.D., who reviewed and critiqued first drafts of all the chapters providing generous input and helpful suggestions and also to Teresa Insetta, M.S., R.D., for her contributions to Chapter 9. A warm thanks to the nutritionists from the Adolescent Training Programs all of whom provided input and shared their expertise.

Finally, I gratefully acknowledge the extensive work of the University of Minnesota's Adolescent Health Program staff; specifically to Annette Robles who prepared endless drafts of each chapter and was responsible for the layout and design of the manual and to Debra Dapper and Linda Pratt who provided assistance with the manual preparation. I also thank Faye Perhus and Jan Gangelhoff from the Public Health Nutrition Program for their assistance with typing and proof-reading.

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ADOLESCENT PREGNANCY: PREVALENCE, HEALTH AND PSYCHOSOCIAL RISKS

Kristi M. Mulchahey, M.D.

INTRODUCTION

Pregnancy in the adolescent has received a great deal of attention recently in both medical and lay literature. Although there have always been large numbers of pregnant adolescents, some worrisome trends are developing. The pregnancy rate appears to be increasing among very young adolescents (i.e., less than 16 years old) who may be least prepared to cope with pregnancy from both the physical and psychosocial standpoints.[1] While pregnancy in the older adolescent may pose less medical risk than in the younger adolescent, it places her at greater socioeconomic risk, as the entry into adulthood becomes increasingly delayed in our society.

DEMOGRAPHICS OF ADOLESCENT PREGNANCY

Adolescent Pregnancy in the United States

In the United States, roughly 13% of all babies are born to adolescent mothers. Each year about one million adolescents become pregnant. By their 18th birthday, 26% of Black teens and 7% of White teens will have had a pregnancy carried to term. Statistics regarding miscarriage and abortion in adolescents are much more difficult to collect, but roughly 40% of adolescent pregnancies end in abortion and about 10% are reported to miscarry. Adoles-

Figure 1
Estimated adolescent birthrates per 1,000 women 15-19, 1985.

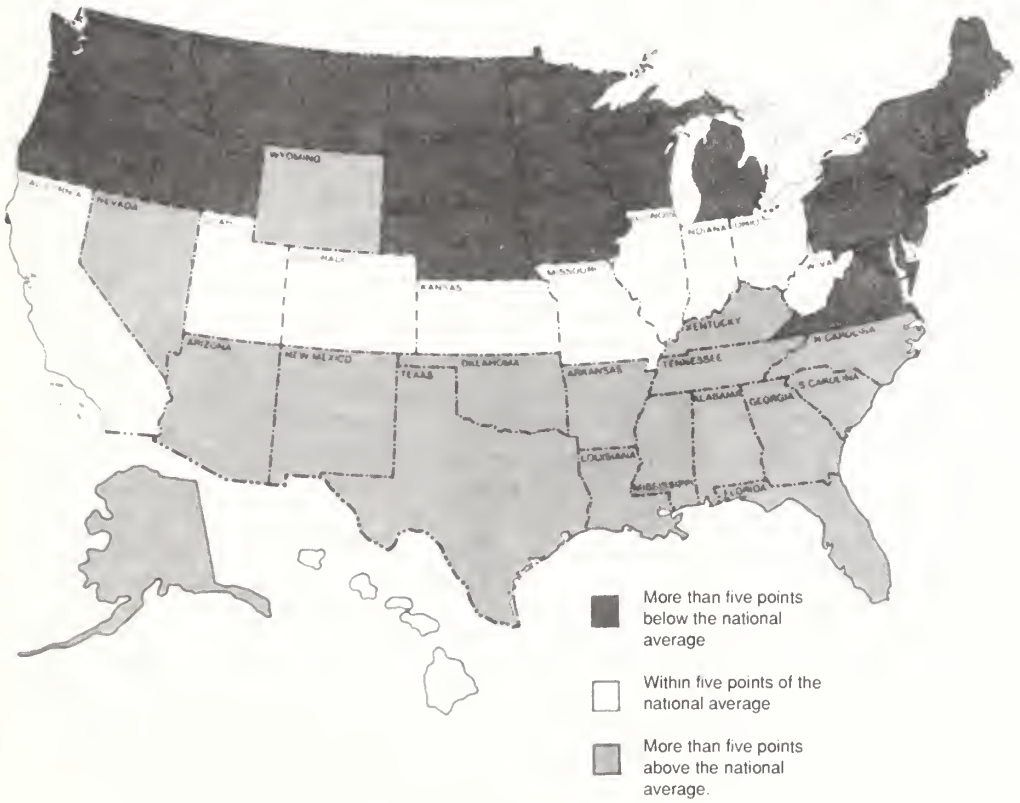
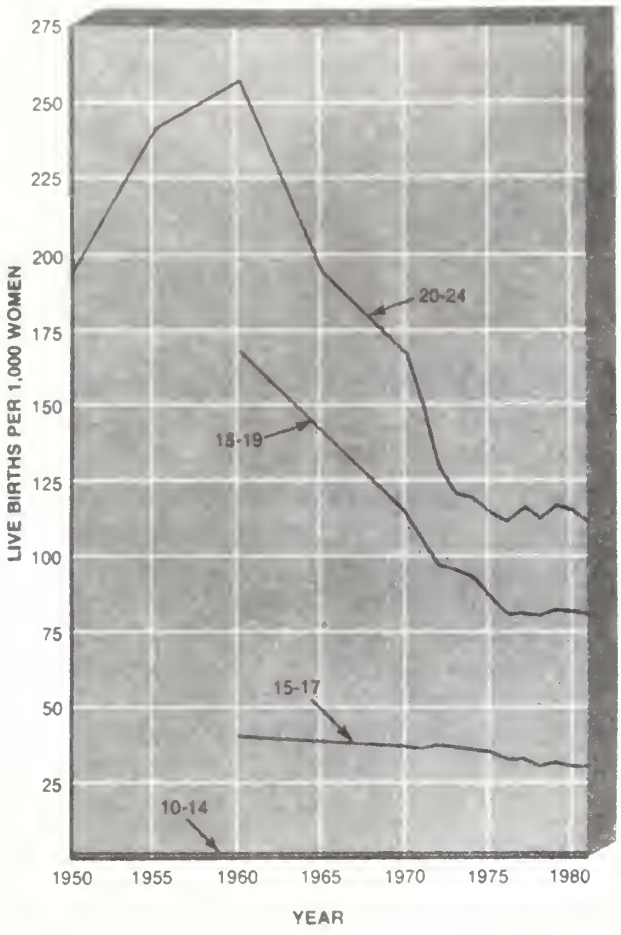


Figure 2
Age-specific birth rates, U.S, 1950-1981



cent birth rates for individual states generally range from a low of 5% to a high of nearly 20%.[2]

During recent years, the pregnancy and birth rates have been falling for all adult age groups, while the birthrate to teens has shown only a very small decline (See Figure 2). Recent figures indicate that the birth rate to very young adolescents (i.e., under 16 years) may be rising.

In the face of declining birth rates among adult women, with much less of a decrease among adolescents,[3] health care providers will be faced with a larger proportion of adolescents among their obstetrical patients. This will be especially true for those health care providers working in public health clinics, since many adolescents have inadequate health care coverage. Even if covered by health insurance as a dependent of their parents, most of these policies will not cover obstetrical services for dependents.

United States Compared With Other Developed Countries

The United States has an especially striking problem with pregnancy among adolescents. In a recent study by the Alan Guttmacher Institute,[4] the pregnancy rates among teens in developed countries were compared. The United States pregnancy rates (for both Black and White adolescents) were twice that of England and Wales and over four times that of the Netherlands.

SEXUAL ACTIVITY AMONG ADOLESCENTS

Why does the United States have such a tremendous problem with pregnancy among our teenagers? The answer is not simple. First of all, we have a large number of sexually active teens. Maciak, et al. reported that 40.2% of White adolescents and 57.8% of Black adolescents were sexually active in 1983. The rate of sexual activity has been increasing most dramatically among White and very young adolescents.[6] Teenagers tend to become pregnant shortly after the onset of unprotected

Figure 3
Births per 1,000 women, by single year of age, 1980 United States compared with other developed countries[5]

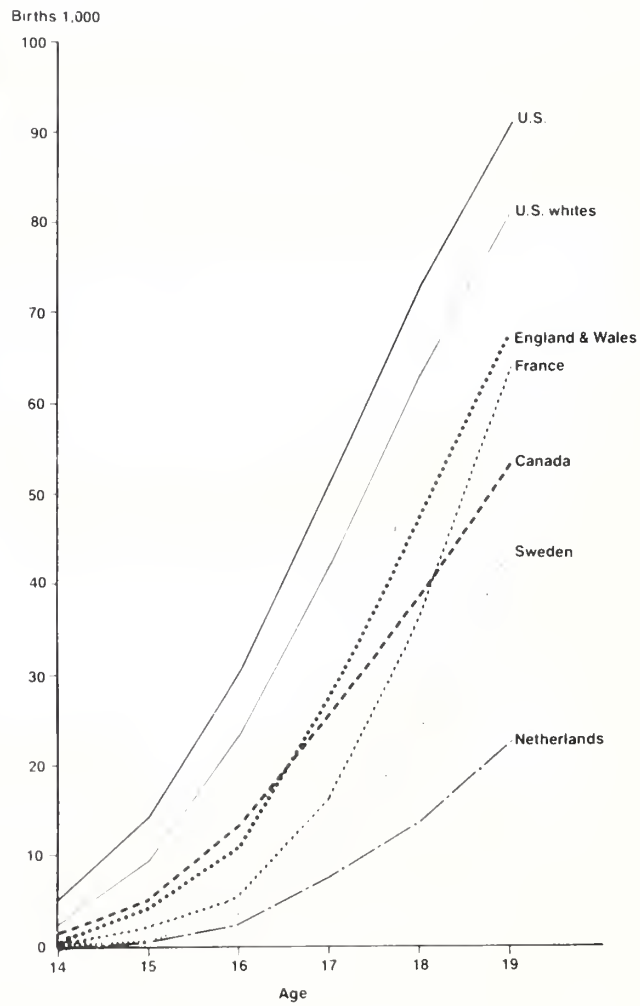
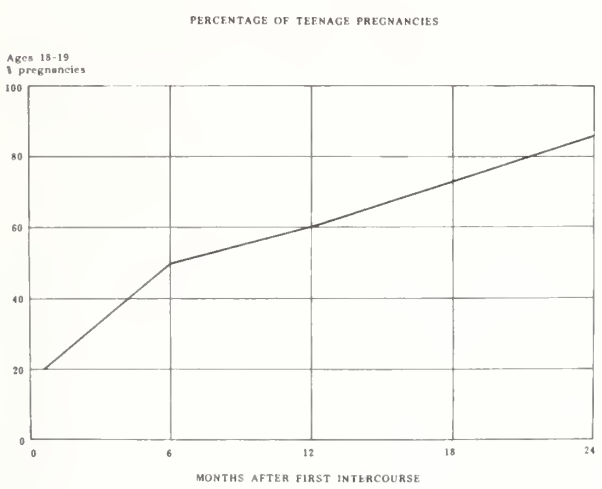


Figure 4
Percentage of Teenage Pregnancies by Months of Unprotected Intercourse[7]



sexual activity with 50% of teenagers becoming pregnant within six months.[7] (See Figure 4.) Teenagers tend to delay seeking contraceptive services for six to nine months after the onset of sexual activity so many teenagers become pregnant before seeking contraceptive services.

BIOLOGIC DIFFERENCES FOR ADOLESCENTS

In a number of different aspects, the use of the phrase "young adult" to describe an adolescent is a euphemism. Just as childhood is biologically distinct from adulthood, adolescence is biologically different from adulthood. Physical differences in the stages of adolescence will effect physical growth, energy requirements, ovulatory function and adaptation to pregnancy. Some authors have suggested that girls who conceive less than two years after menarche (i.e. a menstrual age of less than two) are at higher medical risk during their pregnancy. [8] Although not all experts in the field agree with this concept, it may be helpful in the initial risk assessment of the pregnant adolescent. The 15-year-old one year past menarche will be physically less mature than the 15-year-old who experienced menarche at 11 or 12 years of age. There is a wide variation in the ovulatory function of young adolescents within the first few years of menarche. Some normal adolescents may take two full years to develop ovulatory cycles, while other adolescents will be ovulatory with, or shortly after, the first menstrual period.[9] Linear growth increases very little after menarche, but there is some evidence suggesting that growth of the bony pelvis may continue during the first two years after menarche.

PSYCHOSOCIAL DIFFERENCES FOR ADOLESCENTS

A clear understanding of the psychosocial stages of adolescent development is essential to the provider of health care services to the pregnant adolescent. Pregnancy is also a developmental process with a number of stages in adaptation to parenthood. Pregnancy during the adolescent years places special demands upon the young woman as she struggles with two challenging developmental processes. Sadler and Catrone have labeled this a "dual developmental crisis".[10]

Early Adolescence

The typical early adolescent is experiencing dramatic and rapid physical changes. She is still very dependent upon her parents and may place a great importance on their love and approval. She tends to live in a very "concrete" world and may have difficulty understanding the long term consequences of her actions.

Middle Adolescence

The middle adolescent is becoming more independent but may be in a phase of "self love" where she tends to project her feelings onto others. She may also have mood swings and "ups and downs" in her feelings of self-esteem. Middle adolescents frequently test family values and struggle with dependence vs. independence issues with their families. Many middle adolescents, especially those with less maturity, may still be very concrete thinkers who have difficulty dealing with abstract concepts.

Late Adolescence

In later adolescence, feelings of love and dependence may be directed more toward peers. The older adolescent will tend to look toward the peer group, rather than the parents, as an important source of approval and acceptance. During this time, "formal" thought processes should be developing which enable the young woman to deal with more abstract concepts and be more responsible for the long term consequences of her actions.[11]

Each teenager will progress through these stages at her own pace. One 15-year-old may already show behaviors characteristic of a late adolescent, while another may still be a very concrete thinker and depend strongly upon parental approval and support. The rate of physical maturation varies from teen to teen, physical appearances may be deceiving and are poor predictors of emotional or intellectual maturity.

Psychosocial Adaptation to Pregnancy

During pregnancy, a great deal of physical and psychosocial adaptation must occur as the woman prepares for childbirth and parenthood. The pregnant woman must

adapt to rapid body image changes during pregnancy, along with the physical discomforts of pregnancy. She must be able to nurture and attend to an unseen person, often at the expense of her own comfort and personal independence. The prospective parents are also forming a new family unit, while at the same time often regressing to their own biologic families for support.

As an example, consider the pregnant 13-year-old. Just as she is in the process of adapting to the major physical changes of puberty, she is faced with another set of major body image changes with pregnancy. While the health care provider is stressing the importance of adequate weight gain, she is worried about "getting fat". When it is pointed out that she needs to "eat foods that give the baby what it needs to grow," this abstract concept may be difficult for her to grasp. It may be difficult for a 13-year-old to make lifestyle changes for the benefit of a person she cannot see.

The older adolescent who is struggling with independence from her family may find it especially difficult to turn to the family as a source of support during her pregnancy. In many families with young adolescent mothers, child care is often performed by the parents of the adolescent. Additional stress within the family may arise as the adolescent and her parents deal with "whose baby is this, anyway?"

RISKS OF ADOLESCENT PREGNANCY

Pregnancy during adolescence places the young woman at increased risk for medical, economic, and psychosocial problems when compared with the older woman. A great debate continues over whether these risk factors are inherent due to the young age of the patient (which cannot be changed) or are related more to external social factors (which could be modified to improve pregnancy outcome). Many investigators now believe that the latter is true. An excellent review by Elizabeth McAnarney[12] suggests that young maternal age may be a marker for other risk factors contributing to poor pregnancy outcome, rather than a significant independent risk factor affecting pregnancy outcome.

RISK FACTORS FOR POOR OUTCOME IN THE PREGNANT ADOLESCENT[12,13]

- Maternal age, especially 15 years or younger
- Pregnancy less than two years after menarche
- Poor nutrition/low prepregnancy weight
- Poor weight gain
- Sexually transmitted diseases
- Preexisting anemia
- Substance abuse
- Poverty
- Lack of social support
- Lack of education
- Rapid repeat pregnancies
- Lack of access to age-appropriate prenatal care
- Late entry into the health care system
- Unmarried status

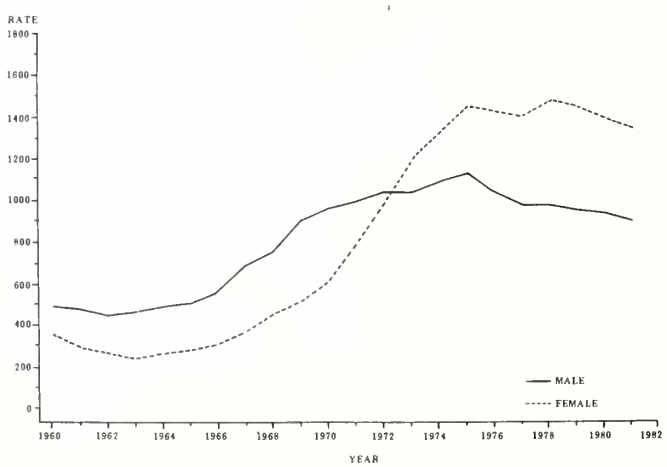
Late Entry Into the Health Care System

Some of these risk factors which an adolescent may be likely to bring to her pregnancy can be addressed by the clinician. Young women may enter into the prenatal care system late for a number of different reasons. For many younger adolescents, lack of knowledge about pregnancy or a strong denial of the symptoms of pregnancy may lead to a delayed diagnosis. Adolescents are often unaware of the importance of early prenatal care. Access to care may be limited by financial or other barriers. Adolescents frequently are not knowledgable about entry into the health care system (e.g., where to get prenatal care and how to make an appointment) and may be reluctant to enter a system designed primarily for the adult patient. Transportation problems and conflicts with school schedules may also hinder compliance with prenatal visits.

Sexually Transmitted Diseases in Adolescents

Adolescents are at greater risk for sexually transmitted diseases. The association between genital tract infections and poor pregnancy outcome, especially low birth weight, is an active area of investigation. Although the role of the treatment of sexually transmitted diseases in the prevention of prematurity is unproven, the detection and treatment of sexually transmitted diseases in a high

Gonorrhea in U.S. Adolescents[16]



risk population is in keeping with good medical practice.

Sexually transmitted diseases are more common during adolescence for a number of possible reasons.[14] First, adolescents tend to have multiple sexual partners and are less likely to use a barrier method of contraception. Developmentally, most adolescents have a large exposed area of columnar epithelium on the portion of the cervix exposed to the vagina. This site is especially vulnerable to infection with gonorrhea and Chlamydia trachomatis. Infection with C. trachomatis is especially common in adolescent populations; several studies have reported a 20-30% prevalence in sexually active teenagers.[15] Although the prevalence of gonorrhea is less than that of chlamydia, the incidence is rising dramatically; currently, adolescents have the highest age specific rate of gonorrhea in the United States.[16]

Although the contribution of each of these individual risk factors is not completely known, it is clear that a general population of teenagers may have poorer pregnancy outcomes when compared with adults. Many studies have indicated that adolescent pregnancies carry significant risks for both the mother and her infant.

MATERNAL HEALTH RISKS ASSOCIATED WITH ADOLESCENT PREGNANCY[12,13]

- Pregnancy induced hypertension
- Premature labor
- Intrauterine growth retardation
- Anemia
- Maternal mortality
- Increased incidence of cephalopelvic disproportion

NEONATAL RISKS ASSOCIATED WITH ADOLESCENT PREGNANCY[12,13]

- Increased perinatal mortality
- Increased neonatal mortality
- Prematurity
- Intrauterine growth retardation
- Lack of access to pediatric health care services
- Poor parenting skills

Among all these factors, the greatest medical risk faced by the pregnant adolescent and her child is the possibility of that child being born either too early or too small. Low birth weight and prematurity are significantly increased in the adolescent population. Although many factors contribute to these problems, the result is significant neonatal morbidity and mortality. Data collected by both the National Center for Health Statistics and the Collaborative Perinatal Project show the risk of low birth weight (i.e., less than 2800 grams) is significantly higher for adolescent mothers, especially those 16 years or younger. Multiparous adolescents, although they may be older than adolescents in their first pregnancy, also are more likely to deliver low birth weight babies.[13,17]

PSYCHOSOCIAL RISKS FOR MOTHER AND CHILD ASSOCIATED WITH ADOLESCENT PREGNANCY

- Failure to complete education
- Unemployment
- Poverty
- Dependence upon public assistance
- Poor job satisfaction
- Marital instability
- Greater number of children per mother

Adoption is an option very rarely used by the pregnant adolescent. Parenthood during adolescence has a dramatic effect upon the life options of the young mother and, to a lesser extent, the young father.

Educational Concerns for the Pregnant Adolescent

Fifty to seventy-five percent of the young women who leave school prior to graduation do so because of an unintended pregnancy.[12] For a teenager who has a child, the risk of not completing school is more than twice that for the woman who delays her childbearing until after 20 years of age. Many students express a desire to return to school but limited options for childcare and other factors may prevent this. Even if the young woman does return to school, her chances of graduating are still significantly reduced. Young women who do not marry but remain in their parents' homes are more likely to complete their high school education.

Occupational Concerns for the Pregnant Adolescent

A less adequate education has a dramatic effect upon the jobs available to young women. Women who begin childbearing during adolescence tend to have low paying jobs and less job satisfaction. The risks of unemployment, dependence upon public assistance, and living below the poverty level are significantly higher for the woman who begins her childbearing during adolescence than the woman who begins as an adult.

Marital Stability in the Pregnant Adolescent

Marital instability is also an important factor in the life of the woman who begins childbearing during adolescence. Teenagers are much less likely to marry now because of their pregnancies than in years past. Younger teens are less likely to marry than older teens. Those teens who do marry because of pregnancy are less likely to continue their education and more likely to have a rapid repeat pregnancy than adolescents who do not marry. These young women also have increased rates of marital instability and divorce, which further contributes to the risk of poverty.

DOES IT HAVE TO BE THIS WAY???

Are these medical and social risks associated with pregnancy during the adolescent years unavoidable? If poor outcome in the pregnant adolescent is due solely to the biological immaturity of the young woman, then there is little that health care providers can do beyond measures to prevent pregnancy during the teen years. On the other hand, if the risks of adolescent pregnancy are due to factors associated with young age which may be modified (e.g., limited access to age-appropriate health care, poor nutrition, lack of social support), intervention programs should be successful at reducing the risks of pregnancy during the adolescent years.

RECOMMENDATIONS FROM THE NATIONAL RESEARCH COUNCIL[19]

- Availability of contraceptive services at low or no cost
- Development of school-based programs and clinics
- Sex education programs including information about contraception
- Information to dispel myths among young women about oral contraceptive use
- Encouragement of condom use among young men

Results of a number of intervention programs have been reported in the literature. Most show improved pregnancy outcome in teens enrolled in a multidisciplinary clinic which addresses medical, nursing, educational, psychosocial and nutritional concerns. In particular, the school-based clinics have demonstrated success in reducing the numbers of pregnancies in students, increasing contraceptive compliance, facilitating access to prenatal care, and keeping young mothers in school after delivery of their babies.[20]

RECOMMENDATIONS FROM AMERICAN COLLEGE OF OBSTETRICIANS AND GYNECOLOGISTS FOR PRENATAL CARE FOR TEENS[3]

Health

- General medical care
- Contraceptive counseling
- Easy access to pregnancy testing
- Availability of abortion services
- Maternal/infant nutrition services
- Age appropriate obstetrical and pediatric care
- Screening/treatment for sexually transmitted diseases
- Outreach

Educational

- Access to continued school services during pregnancy
- Vocational training/placement
- Parenthood preparation/education
- Health education

Social

- Individual and family counseling
- Transportation
- Legal assistance
- Assistance with childcare/finances/housing
- Assistance with health care funding

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Resources

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2. National Organization on Adolescent Pregnancy and Parenting, Inc., P.O. Box 2365, Reston, VA 22090.

3. Support Center for School-Based Clinics, Center for Population Options, 1012 14th Street, N.W., Suite 1200, Washington, DC 20005.

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2

PSYCHOSOCIAL GROWTH & DEVELOPMENT

Linda Juszczak, R.N., M.S., M.P.H., P.N.P.

Adolescence is an important stage of development with tasks and phases that define the process of becoming an adult. An important aspect of the nutrition management of the pregnant adolescent is correlating the adolescent's psychosocial development with interviewing and counseling skills and strategies for change.

DEVELOPMENTAL TASKS

Adolescence begins with a response to rapid physiologic change and continues until there is a reasonable answer to the questions: Who am I? Where am I going? How am I getting there?[1] The move towards resolution of these questions involves the completion of a number of tasks and progresses through phases. The adolescent's progress and successful completion of these developmental tasks is dependent upon previous functioning during childhood.[2]

The developmental tasks include:

- Independence from parents.
- Adjustment to physical changes and sexual maturity.
- Establishment of effective social relationships with peers.
- Development of career plans.
- Development of values.
- Development of identity.[3]

PHASES OF DEVELOPMENT

The tasks of adolescence take on varying degrees of importance depending upon what phase of the developmental stage the adolescent is in. The boundaries of early, middle and late adolescence are not exact but trends and characteristic behaviors emerge. Not every adolescent is described by these phases and this process of change may also include periods of regression.

Early Adolescence (Approximately 10-14 Years)

Early adolescence is dominated by the individual's response to pubertal changes. The major characteristics of the early adolescent are a result of rebellion from adults, greater attachment to peers, new body image and the emergence of sexual impulses.[4] It marks the beginning of the adolescent's move towards independence. The physical changes of adolescence together with beginning shifts in cognition force the adolescent to focus on themselves and their body as compared to the idea put forth by their reference groups. The adolescent is seeking acceptance and approval and is vulnerable to feelings of rejection, insecurity, and self-doubt if they see themselves as being defective or inferior. Characteristics of early adolescence include:

- Challenges to parental authority and value system.
- A fascination with sexuality although they have generally not yet entered into sexual relations.
- Comparison of themselves to others.
- Increased importance of peers for self-esteem.
- Same sex peer groups.
- Vague and unrealistic plans for their career.
- Dealing with the here and now, having trouble with the future.[1,2,5]

Middle Adolescence (Approximately 14-18 Years)

The middle adolescent years continue to be characterized by struggling as adolescents deal with increasing autonomy and developing a sense of identity. Their behavior may be determined by a preoccupation with themselves, a belief that they are the focus of attention and a belief that they are special and unique.[6] These egocentric qualities are frequently documented in statements they make about things happening to others, but not to themselves. Most of the pubertal changes have occurred and the focus is now on exploring physical capabilities.[2] The developing capacity to think abstractly

has enhanced the adolescent's intellectual functioning and involves: a shift from the real to the possible, engaging in introspection, constructing ideals and reasoning realistically about the future.[6] The middle adolescent is more concerned with body image as it relates to peers of the opposite sex and confronting their sexual identity is their most significant task. The characteristics of middle adolescence are:

- Continual challenge of parent's authority and shift to peer group.
- An attempt to be comfortable with their body and a concern with looking more attractive.
- Conformity with peers.
- The beginning of heterosexual relationships.
- Career plans begin to develop.
- Challenge of previously taught values and struggle with issues of morality.
- Increased capacity and capability for abstracting.[1,2,5]

Late Adolescence (Approximately 18-21 Years)

By late adolescence the young person has achieved the ability to maintain stable relationships. Chosen life tasks and goals are acquiring shape. The work of defining and articulating social roles has been accomplished. There has been a resolution of the turbulent issues of adolescence. The late adolescent characteristically:

- Has become separate from family and identity is not dependent upon rebellion from parents.
- Has become more comfortable with his/her own values and peers have become less important.
- Prefers intimate, caring relationships.
- Focuses on future planning for his/her career.
- Has a sense of perspective and is able to think through problems with alternatives.
- Is beginning to develop a degree of financial independence.[1,2,5]

ASSESSMENT OF PSYCHOSOCIAL DEVELOPMENT

Collecting information from pregnant adolescents about their perception of family, peers, school performance, vocational and life plans is necessary to:

- Determine the phase of development.
- Assess if they are appropriate and proceeding in a normal manner.
- Develop an approach to counseling pregnant adolescents which is modified for their stage of psychosocial and intellectual development.

Assessment of the pregnant adolescent's cognitive functioning assists in understanding her behavior. She may have a less developed future perspective which has implications for her pregnancy and child rearing.[7] It also guides the practitioner in presenting information the adolescent will be able to understand. This assessment involves evaluating the adolescent's responses and ideas for:

- The capacity to articulate options.
- The ability to see consequences of her actions and to develop alternatives.
- The ability to verbalize her thoughts and feelings.
- The ability to take another's perspective into account as well as her own.
- The amount and kinds of information used in making a decision.[7,8]

Information should also be collected to assess the effects of the pregnancy on the adolescent's psychosocial development. Identifying areas of potential conflict can assist in modifying recommendations for change as well as understanding problems. Some key questions to consider in this assessment are:

- Independence from parents: Does the pregnancy make the adolescent more financially and emotionally dependent on her family or does it divorce her from the family's support?
- Adjustment to physical changes: How do the physical changes of pregnancy affect the adolescent's perception of herself as compared to her peers? How does it affect her sense of femininity?
- Establishment of effective social relationships: How has the pregnancy affected her relationships with peers and with the baby's father? Does she feel socially isolated from her peers?
- Development of career plans: Are her career plans delayed because of the pregnancy and impending parenthood? Are her goals realistic in light of these demands and changes?
- Development of values: Does the pregnancy conflict with the adolescent's values?
- Development of sense of identity: Does the adolescent equate the pregnancy with success of failure? Is her thinking concrete or abstract and how does this affect her understanding of consequences and ability to understand and comply with recommended plans of care? Does she equate pregnancy and parenting with being an adult?

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3

PHYSIOLOGICAL GROWTH AND DEVELOPMENT

Promise Ahlstrom, M.D.

Adolescence (from the Latin "adolescer" to grow up) is defined as the period of life between the onset of puberty and full maturity, and is the state or process of maturing physically and psychosocially from a child into an adult. This section will address physical growth and changes occurring during adolescence and pregnancy.

Adolescence generally refers to the second decade of life, when growth is tremendously accelerated for the second time (the first being in infancy). What makes this transitional period particularly important is not only the rapidity and magnitude of change, but certain qualitative changes as well, most critically, the emergence of reproductive capacity. It is this, more than anything else, which distinguishes a child from an adult.

PUBERTAL DEVELOPMENT

The physical transformation into adulthood includes:[1]

- Acceleration and then deceleration of skeletal growth (the adolescent growth spurt);
- Altered body composition as a result of skeletal and muscular growth, and changes in the quantity and distribution of fat;
- Development of gonads, reproductive organs, and secondary sexual characteristics;
- Further development of circulatory and respiratory systems; and
- Factors that modulate the nervous and endocrine systems to initiate and coordinate all of these changes.

PHYSICAL GROWTH

Physical growth is one of the earliest and more dramatic observable changes occurring during puberty. It is not so much the amount of either height or weight gained, as it is the rate of growth during adolescence. By age 10, females have attained approximately 84% of their adult height and 59% of their adult weight. Within a very few years, they reach adult stature.

Height

- Approximately 16% of adult height is gained during adolescence, most of it during the growth spurt, which lasts 24-36 months.[1]
- Onset of the growth spurt is quite variable (ranging from 9.5 to 14.5 years), but typically occurs by age 10.5 in females.[2]
- Velocity of linear growth is also quite variable, but for an individual the pattern of growth is steady and relatively consistent along a given percentile.[3]
  - Linear growth rate usually peaks (peak height velocity, or PHV) at age 12, approximately one year prior to menarche.
  - During peak height velocity, growth averages 8 cm/year (4 inches/year) in females (see Table 1).
  - Most of the increase in height is due to trunk growth, rather than to elongation of the legs (although leg growth typically occurs first, contributing to the stereotype of the gangling adolescent whose proportions seem disproportionate).[2]
- After the growth spurt, the rate of linear growth drops off dramatically, but growth continues at a slower rate for two to three more years.[3]

Table 1
Normal Limits for Linear Growth Velocity During Puberty in Females

Average Chronological Age	Growth (cm/12 months) by Percentiles 3rd	50th	97th
9	4.0	5.4	6.9
10	3.8	5.4	7.0
11	4.6	6.6	8.4
12 (PHV)	6.2	8.3	10.4
13	3.4	5.2	7.4
14	0.6	2.2	4.0
15	0.0	0.7	1.7

PHV = Peak Height Velocity

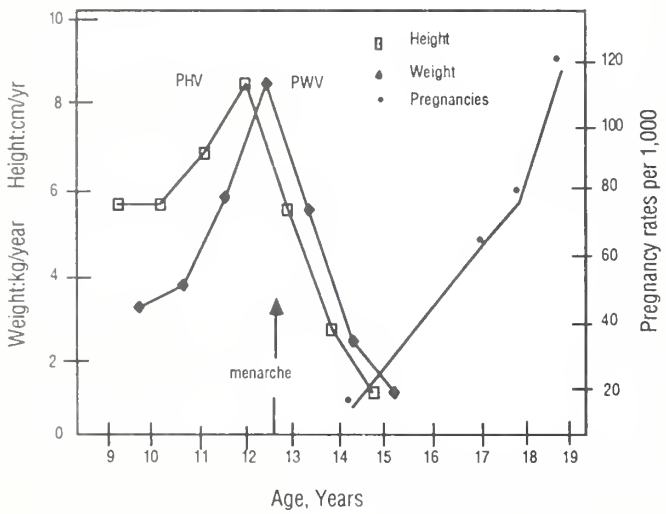
Adapted from Barnes, H.V. *Med. Clin. North Am.* 59(6):1305, 1975.

- By menarche, approximately 98% of adult height has been attained.
  - Between menarche and adulthood, female heights increase only an additional 4-10 cm (two to four inches).
  - The total increment in height achieved after menarche varies inversely with age at menarche (i.e., females who reach menarche at an earlier age grow more, and for a longer period of time, than females with later menarche).[4]

Weight

- Pubertal weight gain in females accounts for approximately 50% of adult ideal body weight.[3]
- The timing of incremental increases in weight during puberty generally parallel incremental increases in height during the same period (see Figure 1).[3,5]

Figure 1
Average Rate of Height and Weight Change in Females During Puberty and Rates of Pregnancy by Age



PHV = Peak Height Velocity
PWV = Peak Weight Velocity

Data compiled from Barnes, H.V.,[3] and Jones, E.F.[15]

- Peak weight velocity (PWV) in females occurs about six months after PHV and frequently coincides with menarche (see Figure 1).[3,5]
- Weight gain velocity tends to vary between and within individuals more than height because it is particularly sensitive to external or environmental factors (e.g., diet and levels of physical activity).

Table 2
Normal Limits for Velocity of Weight Gain During Puberty in Females

Average Chronological Age	Weight Gain (kg/12 months) Percentiles 3rd	50th	97th
9.5	1.3	3.0	5.8
10.5	1.8	3.5	6.4
11.5	3.0	5.6	8.6
12.5 (PWV)	5.5	8.3	10.6
13.5	0.8	5.3	7.6
14.5	0.1	2.2	5.0
15.5	0.0	1.0	3.4

PWV = Peak Weight Velocity

Adapted from Barnes, H.V., Medical Clinics of North America, 59(6):1305, 1975

- During PWV, females gain 5.5-10.6 kg/year (12-23 lbs/year) (see Table 2).
- After the PWV, the adolescent continues to gain weight, but a sharply reduced rate (see Table 3). Females gain 5-10 kg (11-22 lbs) between menarche and the time that they achieve their full adult weight.[3]

Body Composition

- Lean body mass (primarily muscle) increases steadily from childhood into adolescence, peaking about three months after PHV, and plateauing in females about 15 years of age.
- Fat is present at many sites throughout the body, but it is subcutaneous fat which provides much of the contour characteristics of the female body.
  - At around age seven, subcutaneous fat mass begins to increase.[1]
  - With the onset of the growth spurt (i.e., during the three years preceding the PHV), there is a modest but progressive decrease in the rate of fat accumulation, most marked at PHV.[3]
  - After PHV, there is a dramatic increase in the velocity of fat accumulation, particularly in the

Table 3
Approximate Increments in Weight Gain of Postmenarcheal Women

Postmenarcheal Year	Weight Gain kg	(lb)
1	4.6	(10.1)
2	2.8	(6.2)
3	1.1	(2.4)
4 & 5	0.8	(1.8)

Data compiled from Frisch, R.E., Human Biology, 48:353, 1976

regions of the pelvis (hips and buttocks), breasts, upper back, and back of the upper arms.[3]

- By the time the physical maturation is complete, body fat composes 20-25% of body weight in the adult female.
- It has been hypothesized that 17% of body weight as fat is necessary for menarche to occur, and 25% body fat for onset and maintenance of regular ovulatory cycles.[6]

Sexual Maturation

Pubertal development is commonly expressed by chronological age, but because developmental milestones occur at different chronological ages, it is more accurate to refer to an individual's developmental age.

One method of determining developmental age relies on secondary sexual characteristics. Sexual Maturity Rating (SMR, also known as Tanner Staging) of females is based on breast development and pubic hair growth, on a scale of 1 (prepubertal) to 5 (adult).[2] This classification system provides clinicians with a method of quantifying and charting individual pubertal development. The scale is summarized in Table 4.

The development of secondary sexual characteristics is closely related to and overlaps the expected changes in height, weight, and body composition, and the onset of menses (menarche). The following diagram portrays the sequence of events in females.[7]

- There is a large variation in the time at which events occur, though the sequence of events is relatively constant.
- The appearance of the breast bud (Stage 2, SMR) usually marks the onset of puberty in females. Mean age is 10.5 years (range 8-13 years).
- First appearance of pubic hair usually occurs after breast budding, but may precede it.
- Menarche, often assumed to mark the onset of puberty, is one of the events occurring late in puberty.
  - Almost invariably occurs after PHV, during maximum deceleration of linear growth.[2]
  - Usually coincides with or follows shortly after reaching peak weight velocity (see Figure 1).
  - Usually occurs in Stage 3 or 4 of SMR.
  - Average age of menarche in U.S. is 12.7 years (range 9-17 years).
  - Marks a definitive and probably mature stage of uterine development, but does not usually coincide with full reproductive function. (Approximately 55% of cycles in the first year are anovulatory.)

Additional Changes Occurring During Puberty[2]

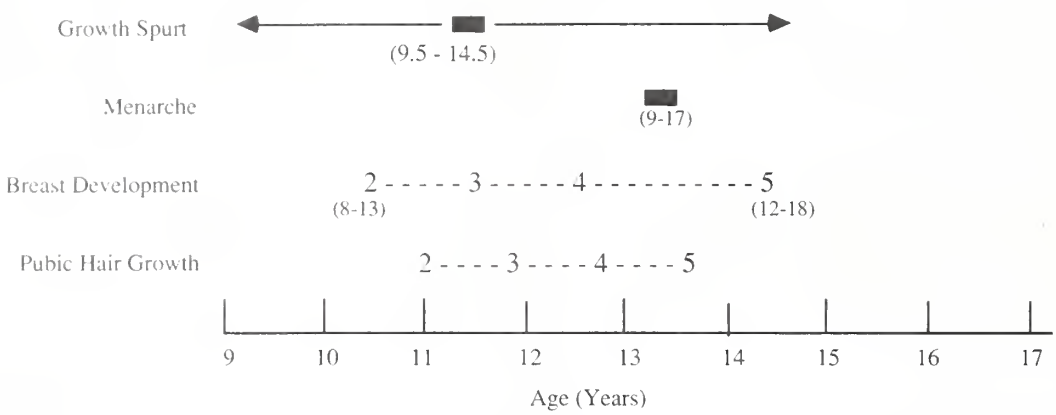
- Skeletal mass, and the size of heart, lungs, liver, spleen, kidneys, pancreas, thyroid, gonads, and uterus approximately double.
- Systolic blood pressure rises steadily throughout childhood, but increases at an accelerated rate during puberty.
- Heart rate decreases from childhood until puberty, at which time there may be a slight, but transient, increase in resting heart rate.
- Basal body temperature gradually decreases with age, reaching adult values by age 12 in females.
- Basal metabolic rate decreases from birth into old age, with a temporary slowing of this decline during the adolescent growth spurt.
- Lymphatic tissues (e.g., tonsils and adenoids) and thymus decrease in size during adolescence, resulting in reduced susceptibility to certain respiratory ailments.

Table 4
Sexual Maturity Rating

Breast Development	Stage	Pubic Hair Growth
Prepubertal; nipple elevation only	1	Prepubertal; no pubic hair
Small, raised breast bud	2	Sparse growth of hair along labia
General enlargement and raising of breast and areola	3	Pigmentation, coarsening and curling, with an increase in amount
Further enlargement with projection of areola and nipple as secondary mound	4	Hair resembles adult type, but not spread to medial thighs
Mature, adult contour, with areola in same contour as breast, and only nipple projecting	5	Adult type and quantity, spread to medial thighs

Adapted from Tanner, J.M., Growth at Adolescence, 1962

Figure 2
Sequence of Events at Puberty in Females



Numbers 2-5 for breast development and pubic hair growth refer to Sexual Maturity Ratings and correspond to mean ages (on horizontal axis) of reaching that stage.

Solid blocks correspond to mean age of peak growth and first menses.

Numbers in parentheses indicate normal ranges of age of occurrence of event.

Adapted from Dunger, D.B. and Preece, M.A.[7]

PREGNANCY

- Pregnancy is a time of remarkable physical growth and adaptation of the mother to the needs of the developing fetus.
- The pregnancy is dated from the first day of the last menstrual period, even though ovulation and conception occur approximately two weeks later.
- Pregnancy lasts for 280 days, or about nine and one third months, of 10 "lunar" months of four weeks each. Trimesters refer to three time periods of 12 weeks apiece.

Maternal Growth During Pregnancy

During pregnancy, tremendous physical demands are made on a woman. In response, her body changes dramatically over the relatively short period of nine months to meet her own increased needs and those of the developing fetus.

When adolescents become pregnant, there is concern that their normal growth requirements, superimposed on the needs of the fetus, may result in either the mother's or the baby's needs being compromised. The question that arises is: Does the adolescent continue to grow during her pregnancy?

- In nulliparous adolescents, growth slows but is not complete at menarche.[8] (See Figure 1.)
  - Although most of the residual growth to adult stature occurs within the first two years of menarche, growth may continue for four years.
  - Early maturing adolescent girls experience even greater incremental growth over a more extended period of time.
- Pregnant adolescents differ from pregnant adults in a number of ways:[8]
  - Adolescent mothers, particularly those at younger ages, tend to gain more weight during their pregnancy than do adult mothers. This may be due to increased fluid retention and increased fluid volume, and not to increased maternal or fetal body mass.[9,10]
  - Even when pregnancy weight gain is the same, the conceptus and placenta are smaller in adolescents.
  - Adolescent mothers tend to be shorter and weigh less at conception than do adult mothers. This may be a reflection of early maturation or undernutrition.
- Whether adolescent mothers continue to grow during their pregnancy remains controversial.
  - A longitudinal study following American adolescents through two or three pregnancies found that mothers' growth was less than expected growth for the postmenarcheal period. Researchers attributed the high weight gain during pregnancy to greater fluid retention and increased blood volume.[10]
  - When leg length was measured to determine linear growth during pregnancy, larger increments of growth were observed in younger adolescents (12-

15 years) during their first pregnancy than in older adolescents (15-18 years) in their second pregnancy, or in more mature pregnant controls (18-29 years).[11]

- Hormones present in the pregnant adolescent may cause premature cessation of growth by stimulating closure of the long bones.[12]
- As can be seen in Figure 1, for older adolescents (16 years and over), growth has nearly ceased. For the young adolescent under the age of 15 or up to 3 years postmenarche, a small amount of growth is still occurring.
- Difficulty in assessing maternal growth results, in part, from inadequate methods of non-invasively and reliably determining adolescent growth potential.[8]

PHYSICAL CHANGES DURING PREGNANCY

Uterus

- The uterus has the remarkable capacity to increase in size during pregnancy and then return to its original state within a few weeks. In its non-pregnant state, the uterus is an almost solid structure with a cavity of 10 ml or less. At the end of the pregnancy, it holds 5-10 liters and weighs about 2.1 pounds.[13]
- At approximately 12 weeks gestation, the uterus is large enough to rise out of the pelvis and become palpable on abdominal exam above the pelvic brim. As it grows, it touches the anterior abdominal wall, displaces the intestines to the side and upward. At term, it reaches almost to the liver.
- With increasing size and weight, pressure is put on the broad ligaments (which suspend the uterus and tubes in the abdomen); this may cause intermittent pelvic pain.
- Pressure on the diaphragm may cause shortness of breath, especially with exercise.
- When the mother is lying supine (on her back), the uterus falls back and rests against the spine, compressing the aorta and the inferior vena cava. Pressure on the inferior vena cava blocks venous flow from the legs back to the heart. This causes edema of the lower extremities. Impaired return of venous blood to the heart not only causes edema, but contributes to the development of hemorrhoids and varicose veins.
- Pressure on the aorta may impede arterial (oxygen containing) blood flow to the fetus. In the left lateral recumbent position (lying on the side, left side down), the uterus no longer presses on the blood vessels and blood flow is improved.
- From the first trimester onward, the uterus has spontaneous, irregular contractions, normally painless. In early pregnancy, they may feel like menstrual cramps. As the uterus enlarges, the contractions become strong and can be felt during the bimanual examination and later with abdominal exam. As term nears, they may occur more frequently, as often as every 10-20 minutes, and last longer. They may cause some discomfort in late pregnancy and account for so called "false labor." They are also known as "Braxton Hicks" contractions.

Cervix

- As early as one month after conception, softening and cyanosis (Chadwick's signs) of the cervix occurs. These are two of the earliest signs of pregnancy.
- These changes are caused by increased blood flow and edema of the cervix and by growth of cervical mucus glands.
- Soon after conception, a clot of very thick mucus obstructs the cervical canal. At the onset of labor, this mucus plug is expelled as the "bloody show."

Vagina

- There is also increased blood flow to the vagina, which produces increased vaginal secretions and the characteristic cyanosis (violet color) of the vaginal walls.
- There may also be a change in the character and quantity of vaginal discharge that must be distinguished from an infection.

Fetus

- Six weeks after the last menstrual period, the embryo is about 1/2 cm (1/4 inch) in length. Arm and leg buds have appeared, the heart and brain are formed.
- By 10 weeks after the last menstrual period, the embryo is 4 cm (2 inches) long and most bodily structures are formed. From this period onward, the fetus grows in size and complexity.
- The age of the fetus can be estimated using ultrasound. This study is most accurate when performed at 14-16 weeks.
- The average term infant weighs about 3000-3500 grams, depending upon race, parental economic status, size of the parents, parity of the mother, and nutritional intake during pregnancy.[13]
- It is now felt that adolescent mothers, even of low gynecologic age (number of years since onset of menses), can have healthy pregnancies with proper nutritional intake, weight gain, and prenatal care.[14]

Placenta

- The placenta, also known as the "after birth," weighs about 1.5 pounds at delivery. It is produced by the fetus and has metabolic, immunologic, and hormonal functions.
- At the site of the placenta, the fetal circulation and the maternal circulation pass by each other very closely. This allows for nutrients like glucose and oxygen from the mother's circulation to diffuse across cell membranes and enter the fetal circulation. No direct mixing of the two circulations occurs. The placenta provides an enormous surface area for this exchange to take place.
- The fetal blood which has picked up nutrients (and also transported wastes for diffusion into the maternal circulation) leaves the placenta, travels in the single umbilical vein within the umbilical cord, back to the fetus, and enters the fetal circulation. Two umbilical arteries bring blood from the fetus to the placenta.

Amniotic Fluid

- Amniotic fluid is a clear fluid that collects within the uterus. At term, an average of 1000 ml is found, contributing about two pounds to the maternal weight gain.
- This fluid provides a medium in which the fetus can move and provides a cushion against possible injury.
- As term approaches, the amount of fluid decreases. This fluid comprises the "bag of waters" which ruptures near delivery.

Blood

- The maternal blood volume increases markedly during pregnancy, about 40-50% above the pre-pregnancy levels. The increase in volume of 1.5 liters accounts for approximately three pounds of weight gain.
- This increase meets the needs of the enlarged uterus, protects the mother and fetus from impaired venous return in the supine position, and protects the mother from complications of blood loss (on the average, 500 ml) at delivery.
- The blood volume begins to increase in the first trimester and often produces a cardiac flow murmur in the mother.
- This is accompanied by a slight decrease in hemoglobin level from 13.3 to 12.1 (in non iron deficient patients).

Breasts

- Breast tenderness is felt in the early weeks.
- In the second month, the breasts grow in size and become more nodular. Veins can be seen under the skin. Nipples enlarge and become darker. The breasts may secrete a small amount of colostrum, a yellowish fluid. Small elevations are seen in the areolae, the so called glands of Montgomery, which are sebaceous glands.
- The increase in breast tissue contributes about two pounds to pregnancy weight gain.

Skin Manifestations

- **Striae Gravidarum:** In the second and third trimester, reddish, slightly depressed streaks are seen in the skin of the abdomen, breasts, and thighs. They occur in about half of all pregnancies and are not preventable. After pregnancy, they remain as silvery lines.
- **Diastasis Recti:** Occasionally, the rectus muscles separate in the midline, unable to withstand the pressure of the enlarging uterus. This creates a diastasis recti; the uterus is no longer covered at the midline by the abdominal musculature.
- **Hyperpigmentation:** In many women, the midline of the abdomen darkens to form the linea nigra. Irregular brownish patches (called the "mask of pregnancy or chloasma) may appear on the face, neck, and armpits. They regress after delivery.
- **Vascular Cutaneous Changes:** Angiomas, called vascular spiders, are minute red elevations with lines branching out from the central body. These, as well as reddening of the palms, are most likely secondary to increased estrogen. They are of no significance and disappear in most women after delivery.

Miscellaneous Physical Changes

- Pregnant women may notice a slight deterioration in their vision. This may be due to fluid accumulation in the lens. It may persist after pregnancy. This should not be confused with more serious visual changes that may accompany hypertension and preeclampsia.
- Nasal stuffiness, congestion, and nosebleeds are common complaints of pregnancy and are most likely due to high levels of circulating estrogen, which cause increased blood flow to the mucus membranes of the nose.
- Gums become inflamed and bleed easily with brushing. This occurs most commonly in the early pregnancy. Good dental hygiene, including brushing and flossing, should be done daily.
- The physical changes of pregnancy are numerous, complex and, above all, complementary and interlocking. The complexity of the growth and development that occurs in the pregnant adolescent parallels the changes of the older woman.

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4

NUTRIENT NEEDS DURING ADOLESCENCE AND PREGNANCY

Mary Story, Ph.D., R.D.

Adolescence is a time of rapid physical growth with nutritional requirements increasing significantly to support the marked increments in body mass and nutrient stores. The additional energy and nutrient demands during pregnancy place adolescents at high nutritional risk. This chapter reviews nutritional needs and requirements of adolescents and pregnancy.

FACTORS INFLUENCING NUTRITIONAL NEEDS OF ADOLESCENT FEMALES (NON-PREGNANT)

- Onset of Puberty: nutrient needs parallel the rate of growth, with the greatest needs occurring at the time of peak growth.
- Body Composition and Size: the increase in lean body mass associated with growth results in an increased need for protein, iron, zinc, calcium, and folic acid.
- Menstruation: increased need for iron (menstrual losses range from 15-28 mg Fe per cycle).
- Physiological Conditions: the following will further increase nutrient requirements:
  - pregnancy/lactation
  - physical activity and participation in sports
  - oral contraceptives
  - certain chronic illnesses (i.e., inflammatory bowel disease)
  - infections

IMPLICATIONS FOR PREGNANCY

Growth

- The greater the amount of uncompleted growth at conception, the greater the nutritional needs of the adolescent.[1]
- Gynecologic Age (GA), the difference between chronologic age and age at menarche, can be used as an indirect measure of physiologic immaturity and growth potential. A pregnant adolescent with a GA of two years or less may still be in a period of appreciable growth and thus will have increased nutrient requirements compared to adolescents who have finished their growth. Growth is generally completed four years after menarche.
- Research indicates that among young, still-growing pregnant adolescents, there may be competition for nutrients between mother and fetus.[2,3] This idea is supported by the observation that fetuses grow more slowly in most 10- to 16-year-olds than in older women.[2]
- The majority of older pregnant adolescents (16 years +) or early maturing teens will have finished their growth prior to conception and will not have increased nutrient needs for growth.[4]

PRECONCEPTION NUTRITIONAL STATUS

- The adolescent growth spurt greatly increases nutrient requirements. Adolescents who have had inadequate diets may enter pregnancy with limited nutrient reserves. These teens as well as those who are underweight prior to pregnancy may require additional nutrients to build up nutrient stores.

NUTRIENT REQUIREMENTS

Data regarding nutrient requirements during both adolescence and adolescent pregnancy are extremely limited.[4,5] The Recommended Dietary Allowances (RDA) from the National Research Council[6] constitute the most complete source of scientific information for determining recommended nutrient intakes.

RECOMMENDED DIETARY ALLOWANCES (RDA)

- For adolescents, the RDAs are given for two age categories (11-14 years and 15-18 years) and are intended to allow for growth needs (see Table 1).
- For practical reasons, the RDAs for adolescents are categorized by chronologic rather than maturational development. Hopefully, in the future, RDAs for adolescents will be based on physiological age rather than chronologic age.
- Recommendations for protein, minerals and vitamins include a safety factor so that the needs of "practically all healthy" adolescents are met. Energy requirements do not include the margin of safety and are considered to be approximate needs.
- Pregnancy: The RDAs for women during pregnancy are tabulated as absolute figures rather than as additions to the basic allowances (See Table 1). Therefore, the RDAs do not address the possible increased needs of pregnant adolescents. The RDAs may underestimate total pregnancy needs for the young still growing adolescent. They also may not be adequate for teens who enter pregnancy in poor nutritional status or have chronic diseases or other complicating conditions.

DIETARY SURVEY FINDINGS

Results of national dietary surveys[8,9] which assess dietary intake from 24-hour recalls indicate the following to be the major dietary deficits/excesses among adolescent females. These same dietary imbalances are also commonly found among pregnant adolescents.[10]

- Low nutrient intakes
  - Vitamins: vitamin A, B_6, folic acid, riboflavin
  - Minerals: calcium, iron, zinc
  - Energy (calories)
- Nutrient excesses
  - Total fat, saturated fat, cholesterol
  - Sugar
  - Sodium

Pregnant adolescents are similar to non-pregnant adolescents in exhibiting suboptimal dietary patterns. A recent study[10] evaluated the diets of pregnant adolescents

Table 1
Recommended Dietary Allowances* during Pregnancy and Adolescence

Nutrients and Units	Pregnancy	Females 11-14 Years (nonpregnant)	Females 15-18 years (nonpregnant)
Energy (kcal)	+300	2,200	2,200
Protein (g)	60	46	44
Vitamin A (mcg RE)	800	800	800
Vitamin D (mcg)	10	10	10
Vitamin E (mg TE)	10	8	8
Vitamin K (mcg)	65	45	55
Vitamin C (mg)	70	50	60
Thiamin (mg)	1.5	1.1	1.1
Riboflavin (mg)	1.6	1.3	1.3
Niacin (mg NE)	17	15	15
Vitamin B_6 (mg)	2.2	1.4	1.5
Folacin (mcg)	400	150	180
Vitamin B_{12} (mcg)	2.2	2.0	2.0
Calcium (mg)	1,200	1,200	1,200
Phosphorus (mg)	1,200	1,200	1,200
Magnesium (mg)	320	280	300
Iron (mg)	30	15	15
Zinc (mg)	15	12	12
Iodine (mcg)	175	150	150
Selenium (mcg)	65	45	50

*Food and Nutrition Board, National Academy of Sciences - National Research Council, 1989.

Note: RDAs for pregnancy are absolute figures and are for all pregnant women regardless of age. The RDAs may underestimate total pregnancy needs for the very young adolescent.

who were participating in the WIC program. Even though the adolescents were receiving supplemental food, their mean energy intakes (1876 kcal) were substantially less than the RDA. More than 20% of the adolescents had dietary intakes providing less than 100% of the RDAs for at least 11 of 16 nutrients studied.

ENERGY NEEDS DURING PREGNANCY

- Factors influencing total energy needs[11]
  - growth status
  - physical activity
  - body composition
  - pregravid weight
  - stage of pregnancy
- Energy requirements
  - Energy is the primary dietary requirement. If energy needs are not met, available protein, vitamins, and minerals cannot be used effectively for various metabolic functions.
  - Energy requirements for pregnant adolescents will be significantly greater than for non-pregnant adolescents. During pregnancy an additional 300 kcal/day is recommended during the second and third trimesters.[6] Unless an adolescent begins pregnancy with depleted body reserves or is still growing, additional energy intake is probably not required during the first trimester.[6]
  - Young adolescents may require higher energy intakes throughout their pregnancy. In general, pregnant adolescents should consume not less than 2,000 calories/day; and in many cases, higher intakes are needed.[13]
  - In studies on pregnant adolescents, the energy expenditures have been found to vary from 38 to 50 kcal/kg/day. Since the energy expenditure is so variable, the best assurance of adequate intake is a satisfactory weight gain.[12] (See Chapter 8 on "Weight Gain.")

PROTEIN RECOMMENDATIONS

- Protein needs increase for the pregnant adolescent. Adequate protein is needed to maintain existing tissue and to allow for optimal growth in new tissue.
- The NRC[6] recommends an additional 10+ gms protein per day throughout pregnancy. Two methods for estimating protein requirements are shown below.
- American diets tend to be high in protein (70-90 gm/day); and national surveys show that the majority of adolescent females, both pregnant and non-pregnant, meet the RDA.[13]
- Conditions (or factors) that place pregnant adolescents at risk for inadequate dietary protein include:
  - low socioeconomic status (protein foods tend to be expensive)
  - low energy intake (when energy needs are not met, protein is catabolized for energy)
  - exclusion of all animal products - eggs, dairy products, meats (strict vegetarians)
- A careful dietary assessment is the best way to determine the protein intake of pregnant adolescents. The quality of the protein, as well as adequacy of energy intake, need to be considered. About two-thirds of the total protein intake should be of high biologic quality, such as is contained in eggs, milk, meat, or other animal sources.

Calcium

- To provide sufficient calcium for fetal bone mineralization without depleting material tissues, 1200 mg of calcium a day is recommended during pregnancy. If growth is completed (3-4 years postmenarche), the recommendation of 1200 mg/day should be adequate. However, this recommendation may be inadequate for the young or still growing adolescent who needs to cover both fetal and maternal growth needs. For the young pregnant teenager or lactating adolescent, a more reasonable intake may be 1600 mg of calcium per day. Adolescents can meet their calcium intake by

Daily Protein Recommendations For Pregnant Adolescents

A. Adolescents < 15 years	1.7 gm protein/kg pregnant weight
Adolescents 15-18 years	1.5 gm protein/kg pregnant weight
Mature women	1.3 gm protein/kg pregnant weight
	From Jacobson[11]
B. Adolescents 11-14 years	1.0 gm/kg non-pregnant weight + 10 gms extra protein per day
Adolescents 15-18 years	0.8 gm/kg non-pregnant weight + 10 gms extra protein per day
	From NRC[6]

consuming 4-5 cups of milk per day; one cup of milk provides approximately 300 mg of calcium.

- Calcium intakes below the RDA of 1200 mg for adolescent females have been well documented.[8,9] Low calcium intakes are caused, in part, by substitution of soft drinks for milk. A low calcium intake during adolescence may result in decreased peak bone mass and may lead to increased risk of osteoporosis in later life.
- Food sources: Dairy products (milk, yogurt, cheese) provide the majority of dietary calcium. One quart of milk contains about 1200 mg of calcium. One slice (1 oz) of cheese contains about two-thirds as much calcium as one cup of milk. Additional sources include: green leafy vegetables, broccoli, legumes, fish with soft or edible bones (e.g., sardines, salmon), and tips of poultry leg bones and calcium-precipitated tofu.
- Lactose intolerance:
  - The majority of adult American Blacks, Asians, Native Americans, Hispanics, and Middle Easterners are lactose-deficient to some degree. Wide variations in tolerance levels exist among individuals; and most can tolerate a glass of milk or its lactose equivalent, especially when consumed with meals.
  - Suggestions for improving calcium intake among adolescents with symptoms of lactose intolerance include:
    * consume smaller amounts of milk more frequently.
    * drink one cup of milk or less with other foods, rather than alone. When milk is consumed with other food, it is less likely to cause symptoms.
    * choose cheese. More than half of the lactose is removed from cheese in processing. Aged hard cheeses, such as swiss and cheddar, have the lowest lactose content of all cheeses.[14]
    * eat yogurt. Many people find that yogurt with active cultures is well tolerated. Check for the term "active cultures" on the label.[14]
    * use higher fat (whole) milk or chocolate milk, because it passes through the digestive system more slowly.
    * prepare milk at home with an enzyme product. This product can be purchased at most drug stores. Some adolescents prefer the flavor of lactose-treated milk -it tastes slightly sweeter.[14]
    * Look for lactose-reduced milk in the grocer's dairy case. This milk has about 40% less lactose than regular milk. Lactose-reduced ice cream, cottage cheese and American cheese are also available in some grocery stores.
    * To determine how much of a particular dairy food an adolescent can eat without having symptoms (such as gas, bloating, cramps and/or diarrhea) have the teen start with small portions. Then have her increase portion size until she begins to notice mild symptoms. This may be her personal limit.
  - Encourage culturally-acceptable sources of calcium, such as:
    * Asians: Dark green leafy vegetables, bok choy, tofu (if made with calcium sulfate; check the label), canned or dried fish with edible bones.
    * Blacks: Leafy green vegetables.
    * Hispanics: Cornmeal tortillas fortified with calcium, and also cheese.
- Supplemental calcium is indicated when adolescents are unable or unwilling to achieve the recommended dietary calcium intake from food sources.

Iron

- Iron deficiency anemia is one of the most common nutritional problems among both pregnant and non-pregnant adolescent females and occurs in all economic groups.
- During adolescence, iron needs are high due to increased lean body mass, red blood cell mass and onset of menses. Pregnancy further increases iron needs due to growth of fetal tissues and increase of maternal circulating hemoglobin mass.
- The need for iron increases as pregnancy progresses. Iron needs increase throughout the second trimester, reaching a peak requirement in the third trimester when fetal demands are greatest.[11]
- Survey data show that few adolescent females consume the RDA of 15 mg iron/day (range of 9-13 mg/day).[8,9] Therefore, adolescents frequently enter pregnancy with low iron stores.
- Dietary iron is often low due to:
  - infrequent inclusion of iron-rich foods (red meats, legumes, green leafy vegetables and iron fortified cereals).
  - low energy intakes: In the National Health and Examination Nutrition Survey II, the mean caloric intake for females 15-17 years was 1731 Kcal/day. The average concentration of iron in the American diet is 6 mg/1000 kcal.
- Due to the difficulty in meeting iron needs by diet alone, it is recommended that all pregnant adolescents take a supplement of 30-60 mg/day of elemental iron in the form of simple ferrous salts.[15] See Chapter 9 on prevention and management of iron deficiency anemia.

- Food sources: The best sources of iron are meats, dried beans and peas, dark green leafy vegetables, whole grain or enriched breads and fortified cereals. Iron from animal sources is generally well absorbed. Iron from plant sources is poorly absorbed and its absorption is enhanced by vitamin C sources or meats, fish, or poultry.

Zinc

- Zinc affects protein synthesis and is essential for growth. The recommended intake during pregnancy is 15 mg of zinc a day. Young pregnant teenagers who are still growing may have higher needs.
- Zinc requirements are highest in the third trimester when the fetus acquires two-thirds of its zinc stores.[11]
- Zinc intake falls below 75% of the RDA in the diets of both pregnant and non-pregnant adolescents.
- Routine iron and folate supplementation may impair zinc absorption.[15] Therefore, good dietary sources of zinc should be emphasized.
- Food sources: the best sources are seafood, meat, and eggs. Less rich sources are legumes and whole grains.

Folic Acid

- The RDA for folic acid is 150 mcg/day for females 11-14 years old and 180 mcg/day for those 15-18 years of age. During pregnancy the recomendation increases to 400 mcg/day. Folacin is required for DNA and RNA synthesis and is essential during periods of increased cell replication and growth.
- Many adolescent females have low dietary intakes of folate. A recent study[17] found one-third of 12- to 16-year-old females were folate-deficient based upon erythrocyte folacin levels. Pregnant adolescents are at high risk for poor folacin status.
- Those adolescents who do not eat lean meat or leafy green vegetables will be at greatest risk for inadequate folate status.
- A folic acid supplement of 400 mcg per day has been recommended during pregnancy.[15] The majority of prescription prenatal vitamin/mineral supplements contain one mg of folacin.
- Food sources: good sources include green leafy vegetables, liver, legumes, yeast, and breakfast cereals. Less rich sources are found in milk, poultry, and eggs.

Vitamin A

- Vitamin A is essential for normal growth and development. The RDA for pregnancy is 800 mg RE/day.
- Adolescent females have frequently been found to have low dietary vitamin A intakes due to low consumption of fruits and vegetables.
- Low plasma levels of vitamin A have been found in 10-40% of adolescents in the ten-state nutrition survey.[9]
- Excessive doses of vitamin A (10-90 times the RDA) may be teratogenic. Adolescents are at risk because of the use of vitamin A or its derivatives for treating acne and other skin problems. In the early 1980s, congenital malformations were documented in more than a dozen infants whose mothers had taken isotretinoid, a vitamin A analogue, for treatment of cystic acne during pregnancy.
- Food sources: dark yellow and green vegetables and fruits (carrots, sweet potatoes, squash, pumpkin, apricots, cantaloupe, spinach, collards, broccoli), liver, egg yolks, and butter.

Vitamin B_6

- The RDA for vitamin B_6 is 1.4 mg for females 11-14 years of age and 1.5 mg for those 15- to 18-years-old. During pregnancy this increases to 2.2 mg/day.
- Vitamin B_6 inadequacy appears prevalent among adolescent females. In one study,[18] almost half of adolescent females had co-enzyme stimulation values indicative of marginal or deficient status. Mean dietary intake was 1.25 mg/day.
- Food sources: richest sources are chicken, fish, liver, pork and eggs, other good sources are whole wheat products, oats, peanuts and walnuts. Dairy products are relatively poor sources.

Vitamin C

- The RDA for vitamin C during pregnancy is 70 mg/day.
- Pregnant adolescents who smoke cigarettes regularly will have increased requirements for vitamin C. The 1989 RDAs recommend that regular cigarette smokers ingest at least 100 mg of vitamin C per day since smoking increases metabolic turnover of the vitamin, leading to lower concentrations in the blood.[6] A 1/2 cup of orange juice contains 60 mg of vitamin C.
- Vitamin C can have a beneficial effect on iron status. Usual daily dietary intakes of vitamin C (25-75 mg) can enhance the intestinal absorption of dietary non-heme iron by two- to four-fold when the two nutrients are ingested together.[6]
- Food sources: certain vegetables and fruits contain high concentrations of vitamin C (green and red peppers, collard greens, broccoli, spinach, tomatoes, potatoes, strawberries, oranges and other citrus fruits).

Prenatal Supplements

The necessity of vitamin/mineral supplements for pregnant adolescents is controversial. With the excep-

tion of iron, pregnant adolescents theoretically can obtain all of their nutrients through a balanced, mixed diet without the use of additional supplements.[13] Yet, clinical experience suggests that many pregnant adolescents should take a prenatal multivitamin/mineral supplement because of their poor dietary habits.

Recommendations

- For adolescents with deficient diets, a standard prenatal nutritional supplement providing RDA levels is well advised.
- It should be emphasized to the pregnant adolescent that supplements are not a substitute for a poor diet; and the primary basis for good nutrition is properly selected foods.

Dietary Guidelines to Meet Nutritional Needs During Pregnancy

A criteria for a healthy prenatal diet and a food guide for pregnant adolescents are presented in Tables 2 and 3. In Appendix A are tables listing caloric and food sources of various nutrients and sample menus for pregnant adolescents.

Table 2
Criteria for a Healthy Prenatal Diet

Provides enough food energy for adequate weight gain
Is well-balanced and follows the daily food plan (Table 3)
Provides a variety of foods within each food group
Spaces eating in intervals throughout the day
Provides adequate amounts of high fiber foods
Includes 10 cups of fluid daily
Limits beverages that contain caffeine (< 150 mg caffeine/day)
Excludes alcohol
Is moderate in fat, saturated fat, cholesterol, sugar and sodium
Tastes good and is enjoyable to eat

Table 3
Daily Food Guide for Pregnancy

Food Group		Minimum Daily Recommended Servings		
		Non-Pregnant Adolescent	Pregnant Adolescent	Pregnant Adult
Dairy Products - equivalents of 300 mg calcium, & 8 gm protein				
1 cup milk	1-1/2 cup ice cream or pudding	4	4-5	4
2 slices cheese	1 cup yogurt			
1-3/4" cube cheese	2 cups cottage cheese			
3/4 cup custard				
Meat and Meat Alternatives - equivalents of 14 gm protein/serving				
2 oz meat, fish, poultry	2 oz cheese*	2	3-4	3
1 cup dried beans, peas	4 slices bologna			
4 T. peanut butter	1/2 cup cottage cheese*			
2 eggs	6 oz tofu			
Vegetables and Fruit				
Vitamin A equivalents 1000 RE/serving				
1/2 cup greens	1/2 cup green peppers	1	1	1
1/2 cup spinach	1 cup broccoli			
1/2 cup carrots	1 cup apricots			
1/2 cup sweet potatoes	1 cup cantaloupe (1/4 medium)			
Vitamin C equivalents 60 mg/serving				
1/2 cup orange juice, grapefruit juice	1 orange	1	2	2
1/2 cup juices fortified with vitamin C	1 grapefruit			
1/4 cantaloupe	1 cup watermelon			
2/3 cup strawberries	2 tomatoes			
1/2 cup broccoli, brussels sprouts, green peppers	1 cup cabbage (raw)			
	1-1/2 cups tomato juice			
Other fruit or vegetables		2	2	2
Breads and Cereals - equivalents of 2 gm protein/serving				
1 slice bread	1/2 cup cooked cereal, grits	4	5-6	4
1/2 cup cooked rice	3/4 - 1 cup dry cereal			
1/2 hot dog or hamburger bun	5 crackers			
	4" pancake			
cornbread 1-1/2" x 2" x 1-1/2"	1 biscuit, roll			
1/2 cup cooked macaroni or spaghetti noodles	1/2 english muffin			
	1/2 frozen waffle			
Fats and Oils - provides 45 kcal/serving size				
1 teaspoon margarine, butter, oil, bacon fat	3/4" cube pork fat	2	2	2
	2 tablespoons sour cream			
1 tablespoon cream cheese	2 teaspoons salad dressing or mayonnaise			
1 strip bacon				

*Count cheese as a serving of milk or meat, not both simultaneously

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5

EATING BEHAVIORS AND NUTRITIONAL IMPLICATIONS

Mary Story, Ph.D., R.D.

Pregnant adolescents have similar eating behaviors and food preferences as other adolescents. Effective counseling requires an understanding of typical adolescent food patterns. Dieting, skipping meals, snacking, eating away from home, consuming fast foods and trying unconventional diets are common eating behaviors which relate to changing lifestyles of increased independence, busy schedules, search for self-identity, peer influence, group conformity and often body image dissatisfaction with a desire for thinness. In this chapter, key aspects of eating behaviors will be reviewed. Strategies for dietary change are presented in Chapter 14.

SNACKING: A KEY CHARACTERISTIC OF ADOLESCENT'S DIET

- Eighty percent of adolescent females consume at least one snack per day, with a range of one to seven snacks daily.[1] Snacks provide between one-fourth to one-third of the daily energy intake for adolescents.[1]
- Snacks contribute more than "empty calories." A study on nutrient density of snacks among 1,224 adolescent females found that snacks contributed 52% of the RDA for riboflavin, 43% of the RDA for vitamin C and 39% of the RDA for thiamin.[1,2]
- The National Food Consumption Survey (NFCS) found that high sugar foods were the most frequently consumed snack foods among adolescents.[3]
- A 1988 Gallup poll found that the top snack food choices for adolescents were potato chips, corn chips, cookies, candies, and ice cream. These snack foods are high in fat and, in general, poor sources of nutrients.
- Since snacking is a way of life for many adolescents and can make a positive contribution to the diet, it should not be discouraged. Rather, adolescents should be encouraged to choose nutritious snacks. When working with pregnant adolescents, keep in mind that some rarely eat what would normally be termed meals.
- What adolescents eat as snacks often is determined by what is readily available. Suggest they put an orange or bag of peanuts in their purse for snacks. Vending machines often carry yogurt, peanuts, crackers, fresh fruit and juices, and these choices should be encouraged.
- When conducting a dietary assessment, probe carefully about snacks. It is more difficult to remember snacks than meals. Snacking is usually done impulsively or while something else is going on (i.e., watching T.V., being with friends) and often occurs at different times each day making recall difficult.
- Adolescents may feel guilty about snacking due to a societal belief that snacking is unhealthy and only meals should be eaten. Discuss positive aspects of snacking and healthy snack choices.

Table 1
Snack Food Choices of Adolescent Females
(in descending order of popularity)

- Soft drinks
- Bakery products (i.e., cookies, cakes, pastries)
- Ice cream
- Salty snacks (i.e., potato chips, corn chips)
- Fruit
- Milk
- Candy
- Bread
- Meat

From the National Food Consumption Survey[3]

Irregular Meals

- Meal skipping is common, especially during middle and late adolescence.
- Breakfast and lunch are the meals most often skipped by adolescent females.[5] Primary reasons for missing meals are busy schedules, a desire to lose weight, and

among low income youth a lack of food resources.

- As many as one-fifth of all adolescent females skip breakfast and another 50% have poor breakfasts.[4] Poor morning appetites and lack of time are common reasons pregnant adolescents skip breakfast.
- An adequate breakfast should provide at least 300 calories, contribute toward meeting the day's nutritional needs, and provide sufficient protein and fat to give a sense of satiety until the next meal.[5]
- For pregnant teenagers who skip breakfast, give reasons why eating in the morning is important:
  - "After birth, babies need to eat every few hours. Before they are born they also need to eat on a regular basis and the only way they can get food is from you."
  - "It is easier to get all the foods you need in a day if you can stretch them out over the day."
  - "You are more likely to keep up your energy all morning long if you have had some breakfast."
  - "You won't be starving and tempted to overeat or eat alot of sweets if you have had something to eat between last night and lunch today."
- Suggestions for eating in the morning:
  - Provide ideas that are quick and convenient.
  - Encourage the adolescent to come up with her own ideas.
  - Think beyond standard breakfast fare. Sandwiches and leftovers make great breakfasts.
  - If she is in a hurry, suggest she carry something with her.
  - Suggest she try eating "soothing" foods for nausea, such as soda crackers, dry toast or yogurt.
  - Suggest "comfort" foods or her favorite foods if she has a poor appetite.

FAST FOODS: AN INTEGRAL PART OF AMERICAN LIFESTYLE

- Reasons why fast foods restaurants are popular among adolescents:[5]
  - They provide a socially acceptable place to go.
  - The food is relatively inexpensive.
  - They provide familiar foods which are highly preferred among adolescents.
  - There is an informal and casual atmosphere.
  - The service is quick.
  - Ordering requires a minimum of decision-making.
  - The foods can be eaten in or taken out.
  - The eating style is informal.
  - They are a prime employer of adolescents.
- Nutritional quality of fast foods
  - All fast foods are not empty calories (see Tables 3-5).
  - Fast foods can contribute nutrients to the diet, but cannot completely meet the nutritional needs of pregnant adolescents.
  - The nutritional impact of fast foods are dependent upon:
    * frequency of eating fast foods
    * food choices made
- Limitations of fast foods[5,6]
  - Certain foods or meal combinations are excessive in energy when compared with the amounts of nutrients provided. Often, this is because entrees are fried.
  - The percent of energy from fat is high in certain foods or meal combinations. On the average 40% to 50% of calories from fast-food meals come from fat.[6]

Table 2
Breakfast Ideas

Something Different	Something Easy to Carry
Pizza	Fresh fruit
Cheese toast	Peanut butter and sliced bananas on whole wheat bread
Fruit with cheese, cottage cheese or yogurt	Hard cooked eggs
Rice pudding	Leftover meat or chicken sandwich
Sandwiches	Dinner rolls or cornbread with cheese or peanut butter
Tortillas with melted cheese	Packets of peanuts and raisins

Adapted from: Working with the Pregnant Teenager:
A Guide for Nutrition Educators. Washington, D.C., 1981.

Table 3
Nutrients in Two Fast Food Meals

Cheeseburger, French Fries, Vanilla Shake

Nutrient		% of RDA* 0 25 50 75 100
Energy	900 kcal	(36)
Protein	27 g	(45)
Vitamin A	144 RE	(18)
Thiamin	0.5 mg	(33)
Riboflavin	1 mg	(63)
Niacin	7 mg	(41)
Vitamin C	18 mg	(26)
Calcium	507 mg	(42)
Iron	4 mg	(13)

Hamburger, French Fries, Coke

Nutrient		% of RDA* 0 25 50 75 100
Energy	637 kcal	(25)
Protein	15 g	(25)
Vitamin A	23 RE	(3)
Thiamin	0.4 mg	(27)
Riboflavin	0.2 mg	(13)
Niacin	6 mg	(35)
Vitamin C	14 mg	(20)
Calcium	93 mg	(8)
Iron	3.4 mg	(11)

*Percent RDA for a pregnant adolescent
(Based on the 1989 RDAs)

- Iron density is often low compared with the iron requirements of adolescents.
- Calcium, riboflavin, and vitamin A are low unless milk, a shake or cheese is ordered.
- Vitamin C is low if french fries or orange juice are not included.
- Sources of folic acid or fiber are rare.
- Sodium content is usually high.
- Selection of fresh fruits and vegetables is limited.

• Healthier trends in fast food restaurants
  - There is more variety in foods served.
  - Salads and salad bars, low-calorie salad dressings, low-fat milk, baked potatoes, and broiled or baked meats, low-salt items and "lite" (low-calorie) items are increasingly added to menus.
  - Some restaurants are using vegetable oils for frying.

• Counseling tips
  - Moralistic attempts to dissuade the pregnant adolescent from eating at fast food restaurants will only alienate her. Rather, provide education on how to select nutritionally well-balanced meals when using fast food restaurants.
  - Adolescents who eat an excessive amount of meals in fast food restaurants may have little knowledge or skill in meal planning or preparation, or little interest in their health. These areas should be assessed.
  - Provide suggestions on how to "round out" a fast food meal and "pick up" nutrients missing in fast food meals and other foods eaten during the day.
  - Encourage pregnant adolescents to:
    * substitute milk or juice for soft drinks
    * add salads
    * order a cheeseburger rather than a hamburger, if calcium is low
    * bring along fresh fruit
  - For overweight adolescents, or those who need to watch excess energy consumption, suggest the following:
    * Order low fat milk rather than a shake.
    * Choose a small hamburger or cheeseburger, rather than the giant ones. On the larger burgers, have them hold the mayonnaise or sauce. (By excluding the mayonnaise, there is a 150 kcal saving on a Burger King Whopper.)
    * Choose regular fried chicken, not the "extra crispy" recipe.
    * Choose a fast food salad. Go easy on dressings, toppings (croutons, sunflower seeds, etc.), and taco chips. The chicken or shrimp boxed salad will provide protein.
    * Avoid the fries or split a small order with a friend.

DIETING AND WEIGHT CONCERNS

• Adolescence is characterized by intense preoccupation with appearance, especially body weight. The societal and cultural emphasis on thinness contributes to the stress adolescent females feel about their weight.

Table 4
Nutrient Content of Various Fast Food Beverages

Nutrients	Vanilla Shake 10 oz.	Coca-Cola 12 oz.	Orange Juice 6 fl. oz.	2% Milk 8 oz.
Energy (kcal)	352	154	83	145
Protein (g)	9	-	1	10
Carbohydrate (g)	59	40	19	15
Fat (g)	8	-	-	5
Vitamin A (IU)	349	-	200	200
Vitamin C (mg)	3	-	93	2
Thiamin (mg)	0.1	-	0.2	0.1
Riboflavin (mg)	0.7	-	.05	0.5
Niacin (mg)	3.5	-	0.7	0.2
Calcium (mg)	329	-	20	352
Iron (mg)	0.2	-	0.4	0.1

Table 5
Nutrient Content of Selected Fast Food Entrees

	Energy	Protein gm	Fat % kcal	Sodium mg	Percent US RDA Vitamin A	Vitamin C	Iron	Calcium
Regular Roast Beef (Arby's)	353	22	38	590	0	2	20	8
Chicken Breast Sandwich (Arby's)	592	28	41	1340	0	0	20	10
Cheeseburger (Burger King)	317	17	43	651	7	5	15	10
Whopper (Burger King)	626	28	55	842	12	23	27	8
Regular French Fries (Burger King)	227	3	52	160	0	4	3	0
Hot Dog with Chili (Dairy Queen)	320	13	56	985	0	0	10	8
12" Cheese Pizza, 2 slices (Domino's)	340	18	16	660	4	0	20	30
16" Pepperoni Pizza, 2 slices (Domino's)	440	24	29	1080	4	0	20	40
l/4 lb Cheeseburger (Hardee's)	511	29	50	1112	0	0	25	19
Shrimp n' Pasta Salad (Hardee's)	362	14	72	941	34	33	19	10
Original Recipe Thigh (Kentucky Fried Chicken)	278	18	62	517	3	0	6	3
Big Mac (McDonald's)	570	25	55	979	8	5	27	20
Hamburger (McDonald's)	263	12	39	506	2	3	16	8
Chicken McNuggets, 6 pieces (McDonald's)	323	19	56	512	0	4	7	1
Roast Beef Sandwich (Roy Rogers)	317	27	29	785	2	0	23	9
Bacon Cheeseburger (Wendy's)	460	29	55	860	8	0	20	15
Baked Potato with Broccoli & Cheese (Wendy's)	500	13	45	430	35	159	15	25

Information compiled from:
Jacobson, M.F., Fritscher, S. The Fast Food Guide.
The Center for Science in the Public Interest, 1986.

Restrained eating, fasting and dieting, and worrying about food and weight are almost constant issues for many adolescent females.[7]

- Dissatisfaction with weight is common regardless if females are overweight, underweight, or average weight. One survey found over half of the females wanted to lose weight, but fewer than one-fifth were overweight.[7]
- Body dissatisfaction and a desire to be thin leads to dieting, a common behavior among adolescent females. One recent study[8] found that of 1,268 females 13-19 years of age, one-third were on a weight loss diet at the time of the study, 69% had dieted in the past, over half (52%) had begun dieting before age 14, and 14% were chronic dieters.
- Many adolescents employ unhealthful strategies to regulate their weight. One study[9] found that 13% of 15-year-old females reported some form of purging behavior (vomiting, laxatives, or diuretics) to lose weight. Nine percent reported vomiting monthly or less, while 2% reported vomiting at least once a week. In addition, 8% had used diet pills to lose weight. Adolescents are

also vulnerable to fad or crash weight loss diets. Adolescents who are frequent dieters and who become pregnant may have low nutrient reserves and start out pregnancy in poor nutritional health.

- A primary concern for pregnant adolescents is weight gain. Reasons for weight gain, as well as components of weight gain, must be addressed with all pregnant adolescents (see Chapter 8).
- For pregnant adolescents, disordered eating and dieting practices must be assessed in the initial prenatal visit (see Chapter 7).

DIETARY FADS AND UNCONVENTIONAL DIETS

- A central issue in adolescence is establishing identity. Food choices convey strong messages about the individual to family and the outside world. Eating patterns such as vegetarian diets, or religious or cult-related diets, or other dietary fads may be adopted as a way of exploring new roles and lifestyles, attempts to conform, to assert and gain control over one's life, or to rebel against adult conventions. These atypical or fad diets may have positive or negative health aspects.
- Assessment Issues. The following aspects should be assessed in pregnant adolescents who follow an unorthodox or fad diet.[10]
  - Why has the particular diet been adopted?
  - What are the underlying reasons and motivating factors?
  - What constitutes the diet and how long has it been followed?
  - What is the nutritional quality of the diet? Is it adequate for pregnancy? (This assessment should be done by a registered dietitian.)
  - Are the dietary practices beneficial, neutral or harmful? Are there nutritional or health risks involved?
- Management. (See Chapter 9 on vegetarian diets.) The following are general strategies for counseling.[11]
  - Recognize that nutrient needs may be met in a variety of ways.
  - Adopt an accepting, non-judgmental attitude.
  - Reinforce positive aspects of the diet while addressing those practices that may be harmful.
  - Prioritize nutritional concerns.
  - Suggest several alternatives for positive changes and help the adolescent choose the appropriate dietary changes for her.
  - Individualize counseling and guidance.
  - Simplify the information given. Provide reminders in writing.
  - Monitor nutritional status through follow-up visits.

CULTURAL FOOD PATTERNS

- Eating is a personal matter, carrying with it great cultural significance. When working with pregnant adolescents from other cultures, respect and understanding of cultural values, health beliefs, and nutrition practices is needed.
- It is important to become familiar with cultural food habits of client groups routinely seen so that nutrient-rich sources of foods in different food groups can be recommended. However, cultural generalizations about food habits should be avoided. Food habits will vary greatly within any one cultural group, and careful exploration of individual food patterns is necessary. Table 6 provides examples of various cultural foods. Keep in mind that differences in groups are distinct. For example, Hispanics generally include Mexican Americans, Puerto Ricans, Cubans, and South Americans; each with different dietary practices. Likewise, broad differences exist among the many subcultures of Native Americans.
- When conducting a dietary assessment or providing counseling, try to categorize nutrition practices as beneficial, neutral, or harmful.[12] Reinforce those practices which are positive and try to promote change only in those that are harmful.
- Always build on cultural practices. For example, if you want to encourage fluid intake with a Hispanic adolescent, you might suggest drinking more herbal tea, a common cultural beverage.[12]
- Become familiar about cultural health-related attitudes and dietary practices during pregnancy and postpartum. Folk medicine is common, often related to beliefs that certain foods are health-enhancing to the fetus, while others are perceived to be damaging or make delivery difficult. Also, women may alter their diets due to "cravings" for specific foods, believing that unfulfilled food desires result in "birthmarks" (i.e., unsatisfied craving for strawberries may cause red birthmarks; chocolate cravings cause brown marks).[12]
- Historically, Asian and Hispanic cultures subscribe to a "hot-cold" theory of health and diet. The hot-cold theory describes intrinsic properties of a food, beverage, or medicine and its effect on the body. The hot-cold dichotomy may have a strong influence on dietary practices in the prenatal and postpartum periods. For example, the third trimester of pregnancy is often regarded as "hot." Therefore, hot foods and medications such as iron supplements may be avoided during this time.[12]

Table 6
Examples of Various Cultural Foods

Culture	Calcium-Rich Foods	Protein Foods	Fruits/Vegetables	Bread/Cereals
Black	Cheese, yogurt, buttermilk, dark-leafy greens	Pork, sausage, scrapple,organ meats, pigs feet, ears, etc., bacon, beans, black-eyed peas	Leafy greens (collard, kale, mustard, spinach, turnips, etc.) sweet potatoes, okra, cabbage, potatoes, lima beans	Biscuit, cornbread, grits, rice, pancakes, cooked cereals.
Hispanic	Cheese, flan, tortillas made from lime soaked corn; milk	Legumes (garbanzo beans, pinto beans, lentils) beef, pork, chicken, eggs	Chilies, onions, tomatoes, squash, corn, pumpkin, avocados, melon, peaches, sapote	Tortillas, rice, oats, cornmeal, pan dulce (sweet bread)
Chinese	Flavored milk, ice cream, leafy greens, tofu, canned fish	Pork, fish, seafood, chicken, duck, eggs, nuts, beans, tofu	Water cress, yin choy, turnips, green peppers, broccoli, snow peas, bean sprouts, bamboo shoots	Rice, noodles, barley, buns, millet
Southeast Asian	Few milk products, soybean milk, tofu, leafy greens, dried fish	Fish, seafood, pork, chicken, peanuts, beef	Bamboo shoots, bean sprouts, green beans, butter-melon, greens, lotus root, peppers, tomatoes	Rice, noodles, french bread
Native Americans	Buttermilk, yogurt, cheese, greens	Eggs, fish, pork, chicken, game (venison,rabbit, ground hog, etc.) pinto beans, lentils, nuts	Corn, squash, berries, mustard greens, potatoes, apples, pears, oranges	Frybread, cornbread, rice, bean bread, bread

Source: Adapted from L. Mellin, in Compendium of Resource Materials on Adolescent Health, U.S. Department HHS, Rockville, MD, 1980

ADOLESCENT PERCEPTIONS ABOUT FOOD AND EATING

A recent survey looked at food-related views of 900 adolescents using a small group discussion format.[13] The vast majority of adolescents felt that adolescents, as a group, have poor dietary habits. To improve their diets, adolescents felt they should:

- Balance their diets. This included eliminating some foods (high sugar foods and "junk foods") and adding others such as vegetables, fruit and milk.
- Eat more meals and have better planning of meals.
- Have schools provide healthier, more nutritious meals, both in vending machines and the lunch lines.

In general, adolescents knew what they should and should not be eating. The following four themes emerged as the major barriers to improving their diets:

- Lack of time. This was a major factor. Adolescents said they were too busy to worry about food and eating right. Common remarks were "people our age are so busy that we don't have enough time to change bad habits." "We have too many pressures on us."
- The inconvenience of eating properly. Because of an active lifestyle, they felt it was too much trouble to prepare and eat healthy foods. Rather, they say they are lured to fast food places and to eating convenience foods such as soft drinks, candy, and chips which are widely available. The prevailing view among adolescents is that good nutrition is too much of a bother.
- Lack of self-discipline. Many adolescents felt they did not have adequate self-discipline needed to eat healthy foods, since there is a strong preference for "junk foods."
- Lack of a sense of urgency. The feeling that "I'll worry about it later in life."

Implications For Pregnant Adolescents

The above barriers and concerns also apply to pregnant adolescents. If pregnant adolescents are to make dietary changes, it must be done within the context of their everyday lives and fit in with their lifestyle. Pregnant adolescents, like other adolescents, tend to eat what is available and convenient. The nutritious foods they need are not always easily available to them at places and times when they do eat. It is also of primary importance to realize that pregnant adolescents will often lack a stable and continuous food supply.

Every pregnant adolescent needs to hear the message that the single most important things they can do to have a healthy baby is to eat well, gain an appropriate amount of weight, and avoid alcohol and drugs. Health professionals need to play a facilitative role in teaching them skills and providing guidance that will enable them to make informed food choices. Strategies for working with adolescents for dietary change are presented in Chapter 14.

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6

NUTRITION AND LIFESTYLE: PERSPECTIVES OF PREGNANT ADOLESCENTS AND TEEN MOTHERS

Corinne Malecha, M.P.H., R.D. and Mary Story, Ph.D., R.D.

To gain a better understanding of attitudes and experiences towards eating and weight gain during pregnancy, nine focus groups were conducted with 57 pregnant adolescents and teen mothers from Minneapolis and St. Paul, Minnesota. Participants ranged from 14-18 years and consisted of Blacks, Whites, Hispanics, Native Americans and Southeast Asians.

A series of questions were developed to guide the discussion on the following topics: vitamin/mineral supplementation, eating habits, substance use, exercise, weight gain, the relationship of eating and weight gain to the health of a baby, and advice for health professionals when working with pregnant teens. Each focus group was moderated by two nutritionists with expertise in adolescent health. Each session was tape recorded and transcribed verbatim. The following is a summary of each of the seven topics addressed.

CHANGES IN FOOD HABITS

The adolescents were asked if and how their food habits changed during their pregnancy. The majority indicated they increased their food intake once their pregnancy was diagnosed. Some increased their intake of specific food groups including fruits, vegetables and dairy products while others ate more in general (including candy, fast food, and baked goods). Many viewed their pregnancy as an affirmation to eat greater quantities of food because they were eating for two. Rarely did anyone decrease the amount of food they consumed. A number of teens chose fast foods as the mainstay of their diets because it was quick and easy, while others reported eating less fast food because their mothers, family, or friends told them that fast food would jeopardize the baby's health.

> "Well, I did think about what I ate, I made sure I drank a lot of milk and stuff like that, but I really didn't take it into consideration until I felt the baby." (Tina, 16 years-old)

The adolescents were also asked to identify their favorite snacks and beverages during pregnancy. Candy, cupcakes, chips, pizza, ice cream, fast food, pickles, and olives were identified as their snack items of choice. Carbonated beverages, orange juice, kool-aid, milk, and water were identified as their favorite beverages. Many indicated they had changed from caffeinated to decaffeinated sodas for the health of the baby. The majority of participants began drinking milk (some in large quantities) once they realized they were pregnant.

The majority of the teenagers did not change their meal patterns. A few reported eating three meals a days, but most continued to consume a large amount of their food through snacks. Breakfast was the meal most likely to be added to their daily meal plan if changes were made.

DOES THE FOOD YOU EAT AFFECT YOUR BABY?

The most difficult question for teenagers to answer, particularly the younger ones, addressed the relationship between food and the health of their baby. While most acknowledged there was a positive relationship, they were unable to explain why. The most common beliefs and explanations were:

> "a greater amount of food is needed when you are pregnant, because only a small amount of food goes to the baby."
>
> "everything you eat goes first to the baby, and second to the mother."
>
> "everything you eat goes directly to the baby."

There were also many misconceptions such as "the good food you eat goes to the baby, but the junk food goes to the mother and makes her fat." Other myths related to cravings — "If you crave something, you gotta eat it, your baby is telling you what it needs." Several also believed that an excessive amount of one particular food eaten during pregnancy would cause the fetus to have either a birthmark representing that food, or would result in having the baby develop an affinity for that particular food later in childhood.

WEIGHT GAIN

Participants recalled a variety of weight gain recommendations ranging from no specific recommendations to two pounds per visit, to 20 - 40 pounds. Reported weight gains of 40 to 60 pounds were most common, although 16 to 80 pound weight gains were also given. There was an overwhelming feeling of confusion as to why an adequate amount of weight gain was important.

"Why should you gain 30 pounds and the baby only comes out about seven or eight pounds?" (Latanya, 14 years-old)

Few adolescents could think of anything positive associated with gaining weight. Most identified the inability to fit into clothing and limited resources to purchase new clothes as the major problem associated with gaining weight.

"I used to cry. I'd cry especially a lot near the end because I couldn't fit into any of my clothes and I didn't want to buy any more clothes that I wouldn't use. I had to wear the same thing almost every other day and I'd cry and cry cause I didn't have anything. I got so sick of it." (Meko, 17 years-old)

Most of the teenagers' said their families, friends, or boyfriends ridiculed them about their weight. It was apparent that the majority of the teasing, regardless of the intention, made them feel bad. One teenager, Sara, who was 3-1/2 months pregnant received a T-shirt from her boyfriend with the word "refrigerator" on the back. She indicated while the T-shirt was funny as first, she felt hurt soon after. Nicknames throughout pregnancy were common such as "fatty", "chubby", "Big Bird", and "beluga".

Several teens who were normal weight prior to pregnancy gained an excessive amount of weight during pregnancy (40 + pounds). They related overeating to emotional stress and depression.

"I've gained over my weight. I gained 16 pounds in one month. I eat non-stop. I guess it's just from the depression." (Punky, 16 years-old)

"I don't go out much. I'm home by myself all day. I just sit and watch TV and eat and eat and eat." (Sandy, 16 years-old)

VITAMIN/MINERAL SUPPLEMENTATION

All but one of the adolescents were given prescriptions for prenatal vitamins. Approximately half took their vitamin supplements and stated they did so because they were afraid of the detrimental effects to their baby if they did not. Others either refused, or had difficulties taking their supplements. The following reasons were given for not taking their supplements:

- Forgetfulness
- Unpleasant taste
- Side-effects (constipation and nausea)
- Problems swallowing
- Unappealing color
- Unaccustomed to taking pills
- Belief that supplements would increase the size of the baby

"I didn't take them. I mean, I didn't want to take them. My sisters say they ain't going to do nothing but blow you up more than you are. And I got low hemoglobin, and I didn't take those pills either." (April, 18 years-old)

"I'd be scared not to take them cause I think something bad would happen." (Colleen, 18 years-old)

SUBSTANCE USE

A large number of participants smoked cigarettes before their pregnancy, many of whom quit or reduced the number of cigarettes smoked per day as soon as they found out they were pregnant. Most of the teenagers believed that smoking is harmful to the fetus. In spite of this belief, some questioned the ramifications of smoking during pregnancy because their mothers, friends, or sisters smoked during their pregnancies and they all delivered "healthy babies". It was also felt that there was an association between smoking during pregnancy and short labors (a motivating factor to some).

"You know they say don't smoke and do this and this so your kid will be better. All my friends smoked and I ain't seen nothing wrong with their kids." (Sarah, 16 years-old)

The majority of teens said that alcohol was harmful during pregnancy, but many qualifying statements were made. For example, it was felt that alcohol is only harmful if consumed during the later stages of pregnancy; and that not all alcohol is bad (beer and wine won't harm the fetus, but hard liquor will). A few felt that beer was beneficial for them, as well as their baby.

"My doctor told me and I said, no, I don't drink or nothing. But I was like, when I was pregnant, I used to go to parties and stuff once in a while and have a little beer and stuff. And I asked my doctor, does it hurt me? He said No! Matter of fact, you can drink a beer once in a while—all you do is pee it right back out. He said it was alright, just don't make it a habit or nothing." (Sandy, 15 years-old)

A few of the adolescents also identified eating non-food substances (pica) such as Comet, dirt, starch, ice and Downey fabric softener.

EXERCISE

The majority of teenagers did not engage in any form of exercise before they became pregnant. Most expressed a general feeling of lethargy during pregnancy. Many indicated that they did not exercise because "people were constantly staring at them". They often felt people were judging them because of their age.

> "They would look at you. Older people, they'll stare at your stomach — I hated going out in public. It would have been better if I would have been older or married." (Mandy, 17 years-old)

While adolescents were aware of the weight gain associated with pregnancy, they did not think that exercise would help control the amount of weight they gained.

> "I didn't want to exercise because I didn't think I'd get that fat. Surprise, surprise." (Sixta, 15 years-old)

ADVICE: WHAT TYPE AND FROM WHOM

Teenagers were asked to describe the type and source of advice they received during their pregnancy. Mothers, female relatives, physicians, boyfriends, nutritionists, and friends with children were listed as the primary sources of advice.

Boyfriends were notorious for telling participants to eat healthier foods, drink less carbonated beverages, and eat more food. The majority of young women perceived their boyfriends as supportive and loving. "He's on me a lot about how I eat, but it means he cares a lot about me." Others felt they were overbearing and nagging.

ADVICE TO HEALTH PROFESSIONALS

Finally, adolescents were asked "what advice would you give to doctors, nutritionists or nurses talking to pregnant teenagers like yourselves, about eating well during pregnancy." They felt that health professionals should:

1. Take more time for clarification.
2. Treat everyone as an individual, by giving individualized examples.
3. Treat adolescents the same as everyone else. Many felt that if they were older, they would have been given more information. "Don't treat us like we are dumb."
4. Focus recommendations on the fetus through discussions on ways to make the baby healthy.
5. Assess how the person feels about her pregnancy; it will make a difference as to how the person takes care of herself.
6. Assess weight gain in a nonjudgmental manner.
7. Be less repetitive.
8. Discuss a wider variety of healthy foods to eat.

SUMMARY AND IMPLICATIONS

Information collected from the focus groups provide several areas to be cognizant of when working with pregnant teens.

1. Pregnant teenagers want to have healthy babies.
2. Counseling interventions for pregnant teens cannot rely on adult perspectives. It is important to develop a clear understanding of adolescent psychosocial development and adolescent lifestyle and also to listen to how teenager's view eating and weight gain during pregnancy.
3. Myths and misconceptions are prevalent among teens regarding nutrition, weight gain and substance abuse. These areas need to addressed and corrected.
4. Pregnant teenagers want to be treated like other clients, with respect and dignity.
5. Pregnant teens are sensitive to the stigma society attaches to those who are sexually active and become pregnant. Counseling should be conducted in a supportive and nonjudgmental manner.
6. Acquaintances and friends of teens who have "healthy babies" in spite of unhealthy eating and lifestyle behaviors during pregnancy have a powerful impact on the pregnant adolescent's level of compliance.
7. Health professionals are inconsistent in providing weight gain recommendations creating confusion and mistrust among adolescents.
8. The most effective messages, when working with adolescents, are those that are simple, concise, and individualized.
9. Health care providers should increase the teenager's sense of responsibility for their health and the health of their babies by encouraging them to internalize the belief that their actions have a direct effect on the well-being of their infants.

7

NUTRITION ASSESSMENT OF PREGNANT ADOLESCENTS

Mary Story, Ph.D., R.D.

Pregnancy places adolescent females who, in general, are at risk for nutritional problems at even greater risk. Because of this, and the importance of nutrition in the course and outcome of pregnancy, all pregnant adolescents should have a formal assessment of their nutritional state at the beginning of their prenatal care with ongoing surveillance throughout the pregnancy.

The purpose of the nutrition assessment is:

- To evaluate the nutritional status of the pregnant adolescent.
- To identify those pregnant adolescents who are at nutritional risk.
- To formulate an individualized nutrition care plan with follow-up and referral, when appropriate.

The process of nutrition assessment is summarized in Figure 1. This chapter will discuss the components of nutrition assessment, management, and follow-up.

NUTRITION ASSESSMENT: A TEAM EFFORT

The assessment of nutritional status in pregnant adolescents may involve several disciplines on the prenatal team. Ideally, a nutritionist (Registered Dietitian [R.D.]) is an integral member of the prenatal care team and coordinates nutrition services. The physician, nurse-midwife, nurse, social worker, and other health team members should all be aware of the nutritional risk factors and be involved with assessment techniques in order to achieve optimal nutritional health for the pregnant adolescent and her baby. Members of the team should make a clear decision about who will be responsible for specific aspects of the screening/assessment process.

COMPONENTS OF A NUTRITION ASSESSMENT

There is no single measurement or test that can give an accurate picture of a person's nutrition status. A complete nutrition assessment requires the evaluation and integration of the following components:[1, 2]

- Relevant history: medical, obstetric, lifestyle, and psychosocial
- Dietary assessment
- Anthropometric evaluation
- Laboratory testing
- Clinical evaluation

RELEVANT HISTORY

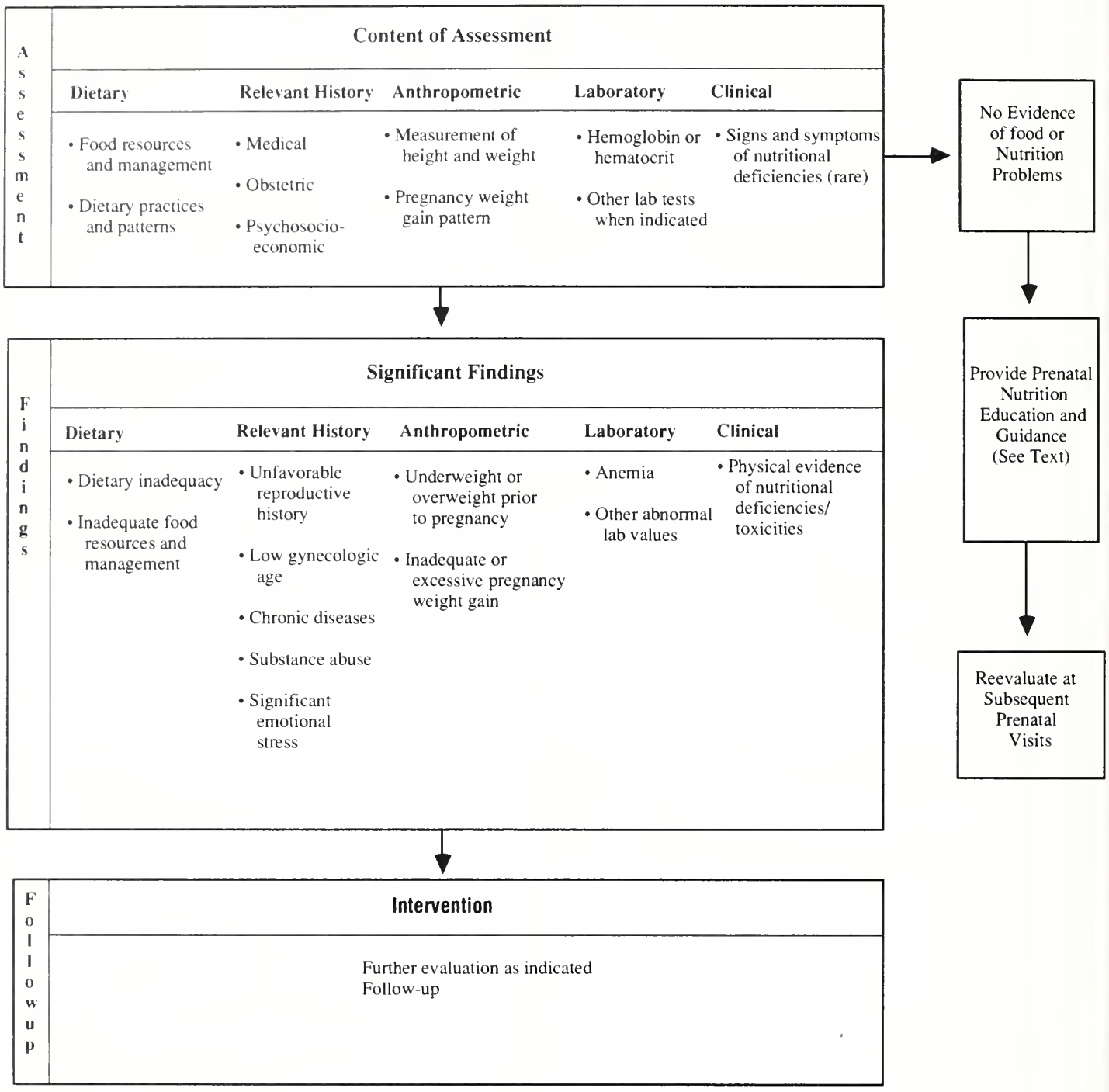
The following information collected from the medical, obstetric, and psychosocial history will help identify nutritional risk factors and nutrition problems. Factors such as current living situation, economic status, and past or present emotional or medical difficulties may all impact on the nutritional status of the adolescent. The following summarizes the most important variables in each area which need to be explored and documented:

Medical History

The medical history will provide relevant information for nutritional assessment in pregnancy.

- History of chronic illness in the family such as diabetes, hypertension, cardiovascular disease, and alcoholism.
- Pre-existing conditions such as diabetes, PKU, cardiovascular or renal disease. (Special nutrition guidance is needed.)
- Prescription and over-the-counter medications.
- Physical disabilities.
- Previous nutritional deficiencies (i.e., iron deficiency anemia).
- Age at menarche (calculate gynecological age: chronologic age minus age at menarche). Note: Gynecological age is also referred to as reproductive or biological age.
- Past and present use of tobacco, drugs, and alcohol (see Chapter 12 for substance use assessment). Alcohol and drug use create a special vulnerability to

Figure 1
Nutrition Assessment Process



nutritional deficiencies.

- Past or present history of an eating disorder: anorexia nervosa, bulimia nervosa (these individuals are at high risk for inadequate diet, low calorie intake, reluctance to gain weight).

Obstetric History

A poor reproductive history may be indicative of nutritional deficiencies.

- Parity and outcomes. (Adolescents who have a repeat pregnancy are at an increased nutritional risk due to depletion of nutritional reserves.)
- Prior low birth weight infants (less than 5-1/2 lbs.).
- Weight gain and patterns in previous pregnancies. (The pattern and amount of weight change in previous pregnancies will identify potential high-risk patients.)
- Length of time between pregnancies. Repeated preg-

nancies or lactation within one-year intervals: high risk for depletion of nutrient stores.

- Prolonged nausea or vomiting in present or past pregnancies. (Persistence may lead to nutritional depletion.)
- Gestational diabetes, pregnancy-induced hypertension, or anemia in past or present pregnancies. (Special nutrition guidance is needed.)
- Use of steroid contraceptives. (May deplete vitamin stores: folate, B_6, B_{12}, C.)

Psychosocial History

Emotional, social, or economic stresses during pregnancy may interfere with an adequate dietary intake.

- Income level: If low income, there may be limited money for food. Calories may be obtained from inexpensive foods low in protein, high in carbohydrates or fats.
- Cultural and ethnic background; language other than English. Cultural dietary beliefs may impact on food choices and consumption patterns.
- Family function: Number in household, intactness of the family, relationships between the adolescent and other family members. Assess family support. In dysfunctional or unsupportive families, there may not be a "healthy" nutritional environment.
- Current living situation: If living alone, in a chaotic environment, or in a large household, she may have an inadequate diet.
- Peer relations: relationships and support from friends. Isolated teens are at risk for inadequate diet.
- Relationship with baby's father: extent of involvement, influence on decision-making.
- Emotional health: feelings of loneliness, depression. Depression may cause lack of appetite or overeating.
- Feelings about pregnancy: acceptance, denial, commitment, motivation. Denial may impact weight gain.
- School enrollment or employment.
- Participation in food assistance programs.
- Educational and cognitive level: needed to tailor nutrition education/counseling approaches.

Nutrition History (See "Dietary Assessment")

DIETARY ASSESSMENT

Fundamental to all nutritional evaluations is the dietary assessment which may include the following parts: nutrition history, dietary intake, and nutrient analysis of diet.

Nutrition History

The following specific information is needed for a nutrition assessment:

- Food management and resources.
  - Food resources: Food availability and budget. Ask how much is usually spent a week/month on food (both groceries and eating out). How large is the household? Do they have enough money for food? Ask "During the last month, were there any days when you didn't have enough food to eat or money to buy food?"
  - Food assistance programs: Do they receive food stamps? Food commodities? Free school lunch? Are they enrolled in the W.I.C. program? (Supplemental Food Program for Women, Infants, Children) Do they go to emergency food banks?
  - Food purchasing: Who does the shopping? How often? Where?
  - Cooking facilities: Refrigerator, stove, oven, microwave, hot plate? Are they in working order?
  - Food preparation: Who cooks? How often? Does the adolescent know basic cooking skills?
  - Eating away from home: How often? With whom? Where? Type of food purchased?
- Dietary practices and patterns.
  - Appetite: Prior to pregnancy and changes during pregnancy.
  - Usual eating and meal patterns: Check eating schedule, with whom, and where. Ask to describe a typical day, including every time she eats or drinks.
  - Usual snack patterns: Frequency, amounts, and typical snacks eaten. Remember, adolescents may snack more than eat meals.
  - Food allergies and intolerances: Milk intolerance and food allergies need to be considered.
  - Cultural/ethnic or religious practices: Check types of foods, preparation methods, taboos or food avoidances. Check beliefs regarding what one should or shouldn't eat during pregnancy.
  - Food preferences and dislikes: Ask their favorite and least liked foods. Any food cravings or aversions while pregnant?
  - Previous dieting practices: Onset, frequency of dieting, methods used to lose weight. Frequent dieting may be indicative of low nutrient reserves.
  - Binge eating episodes: eating a large amount of food in a short period of time.
  - Purging techniques: Check self-induced vomiting, laxatives, diuretics, syrup of ipecac.
  - Faddist or unusual food patterns: Pica (eating of non-food substances).

- Vitamin or mineral supplements: Frequency of usage, type, and level used.
- Attitude about eating well during pregnancy: Is it important?
- Is their eating any different now that they are pregnant? Check changes they have made.
- Special dietary problems of pregnancy: nausea, vomiting, constipation.

Self-administered questionnaires for nutrition history taking can be filled out by the adolescent in the clinic waiting area. However, self-administered questionnaires must be used with great caution in low income and low education populations who may not have the necessary reading or language skills (see sample questionnaire in Appendix B).

ASSESSING DIETARY INTAKE

The purpose of assessing the dietary intake is to evaluate the nutritional quality of the diet. Information on food intake can be obtained by a number of methods including: 1) 24-hour food recall, 2) usual food intake, 3) food frequency list, and 4) food records. The method chosen depends on the specificity desired, the training of the personnel, the time available, and the cooperation of the adolescent. Table 1 lists advantages and disadvantages of the various methods.

1. **24-Hour Recall:** This method involves recording all foods and beverages consumed within the past 24 hours. While this method provides quantitative information on food intake, a major limitation is that it may not be representative of a typical day for a adolescent. This is especially true for adolescents since their diets are generally not consistent on a day-to-day basis. A 24-hour recall should never be used as the sole basis for evaluating dietary adequacy and should always be used in combination with a food frequency list. A recall is extremely useful for nutrition education purposes of reviewing a 24-hour intake with the adolescent and comparing it to the recommended food guide. This is especially useful for concrete thinking adolescents or the very young adolescent. (See Table B-2, Appendix B for an example of a 24-hour recall form.)

Guidelines for Conducting 24-Hour Recall

- Adolescents generally dislike dietary recalls. "It's too hard to remember." Keep in mind that unstructured eating patterns make remembering difficult. It is critical to point out the importance of knowing this information. Some adolescents remember better if it is presented as a challenge: "Let's see how good your memory is."
- An example of how to initiate the recall process is: "I would like to know what you've eaten within the past 24 hours. Could you please tell me everything you ate or drank, including meals, snacks, beverages, candy, and alcohol? Why don't you start with the last thing you've had to eat or drink today and we'll work backwards."
- The adolescent's recall may be aided by beginning with the last thing consumed on the day of the interview and working back to the previous day until a 24-hour time period is evaluated. Remembering what was eaten can be difficult. Always allow time for contemplation.
- Discussing daily routines may jog the memory and improve accuracy of the data. For example, "Did you eat or drink anything between classes?" "After school, did you have anything to eat or drink?" "Before you went to bed last night . . ."
- Alternate between open-ended questions, "What was the first thing you had to eat today?" and more direct questions, "How much?" "How was it prepared?" "Did you finish it?"
- For memory lags, use situational cues: "What did you do yesterday afternoon?" "Who were you with?"
- In order to get a detailed and accurate assessment of dietary intake, specific information is needed on amounts and types of food eaten. Table B-3 in Appendix B provides a checklist of specific information and probing questions needed for conducting detailed dietary assessments. Food models or props should be used to help the adolescent indicate quantities more accurately. Props include a teaspoon and tablespoon; several sizes of glasses and bowls (including a 4-ounce and 8-ounce measure); and something to indicate thickness of meat, such as a ruler.
- To improve accuracy, prepare a list of foods commonly consumed by adolescents and, at the end of the recall, ask them if they ate any of these other foods on the list.
- After completing the 24-hour recall, it is important to ask the adolescent if it was a typical intake and, if not, how it was different from usual intake.

2. **Food Frequency List:** This method involves asking an adolescent how often she eats a food or a category of foods. It is a good cross-check to use with the 24-hour recall and provides qualitative information. (See Table B-4 in Appendix B for a food frequency form.)

3. **Usual Intake:** This method focuses on what is eaten on a typical day, rather than the last 24 hours. While it provides a more representative intake, it requires more decisions on the part of the adolescent (what is "usual"). It is effective for learning more about the adolescent and her general activities. A good technique is to walk the adolescent through her usual day's activities from the time she wakes until she goes to bed, all the while relating

her activities to her food intake. For each food mentioned, questions are asked in terms of general habits-food item, form, frequency, preparation, portion, likes and dislikes - not in terms of any one specific day's food intake.[3]

4. **Food Records:** The adolescent writes down all food and beverages eaten over a period of time, usually three to seven days. This method is not recommended for the initial dietary assessment, as compliance is low. It is, however, a valuable technique to use in counseling situations for nutrition problems such as inadequate or excessive weight gain.

GENERAL GUIDELINES FOR COLLECTING DIETARY INTAKE DATA

- Good interviewing skills are the basis for acquiring accurate information.
- The use of at least two approaches for evaluating dietary intake increases the validity of the data.[3] The two methods most commonly used together are the 24-hour recall and the food frequency list.
- The purpose and need for gathering dietary information must be explained to the adolescent at the onset of the interview.

Table 1
Strengths and Limitations of Various Dietary Methods Used in Clinical Settings

Strengths	Limitations
24-Hour Recall	
Respondent burden is low Time for administration is short Well-accepted by most respondents Useful in clinical situations More objective than dietary history	Single 24-hour recall does not represent usual intake Interviewers must be trained Forgetting is often high for liquids, snacks, sweets, alcohol and fat Desire to please interviewer may result in distorted intakes
Food Frequency Questionnaire	
Provides description of how often foods are eaten Does not require highly trained interviewers and some types may be self-administered Quick to administer Useful when purpose is to establish relative ranking with respect to intakes or certain food items in group Helpful for rapid estimates of single nutrients or food groups	Lists compiled for the general population are not useful for obtaining information on group with different eating patterns (e.g., vegetarians or those on special ethnic or therapeutic diets) Limited information about nutrient intakes can be obtained Respondent burden rises as number of items queried increases Intakes are underestimated because not all foods eaten are listed
Food Diary	
Record of what is eaten is recorded at time of consumption Individuals can be instructed in advance so that recording errors are minimized	Food intake may be altered during reporting periods Respondent burden is great With teenagers compliance is low Literacy is required Portion sizes are difficult to estimate
Usual Food Intake	
Focuses on food eaten during a typical day Helpful in gaining broad knowledge about usual eating patterns Quick to administer Respondent burden is low	Requires decisions on what is "usual" Provides only qualitative information on the diet

Adapted from: Dwyer, J.T. Assessment of Dietary Intake in Modern Nutrition in Health and Disease. Shils, M.E. and Young, V.R. (Eds.): Lea & Febiger, Philadelphia, 1988.

- Avoid using the term "diet" with the adolescent, as this word is commonly associated with weight loss and often is confusing to her.
- Create a comfortable atmosphere and show a sensitive, respectful, and caring attitude.
- Be non-judgmental and non-critical of the foods eaten. Adolescents often feel sensitive about their diets, especially if they feel they aren't eating the right foods. If they perceive criticism, they may not give honest and accurate information.
- Keep in mind that adolescents' eating and food habits and lifestyle may not conform to your own values. People can receive nutritious diets from a variety of patterns.
- The wording of a question is critical. Avoid questions that suggest the correct answers, e.g., "Did you have a dark green vegetable today?" or "How much milk did you drink today?"
- Avoid interjecting positive or negative evaluative comments during the assessment. For example, a comment such as, "That's great! You drank four glasses of milk yesterday," may give the message that she can elicit praise by saying the right things. Critical comments such as, "You mean you really ate three candy bars yesterday," may cause her to avoid telling the truth. Save comments until the end of the assessment.
- Keep good eye contact and a conversational tone.
- Use three-dimensional food models, cardboard food models, or food portion visuals to help estimate quantities of foods eaten. How a serving size is defined will vary among teens. For example, when a teen says she drank a cup of milk, the glass (cup) size may be 16 ounces. Sources for food models are listed at the end of this chapter.
- If you want a teenager to write down her past 24-hour food intake or keep a food diary, be sure to explain that you don't care what their writing looks like or if there are misspellings. Some teenagers may be reluctant to record their food intake because of being embarrassed about spelling mistakes or poor penmanship.

EVALUATING DIETARY DATA

Dietary data should be evaluated in terms of nutritional adequacy. Diets can be evaluated using various approaches.

- On a qualitative basis, the diet of a pregnant adolescent can be rapidly assessed for general adequacy using the food intake evaluation guide in Table 2. This guide should highlight potential areas of concern or points that need further evaluation or more specific quantitative analysis.
- The adequacy of the food pattern should be reviewed with the adolescent, comparing her food intake with the recommended food guide. A nutrition evaluation sheet for use with the pregnant adolescent is in Table B-5, Appendix B.
- For those with suspected dietary inadequacies or excesses, dietary information can be translated into nutritional data and then compared to the Recommended Dietary Allowance (RDA). (See RDA, Chapter 4.) Numerous computer programs, some of which are client-operated, are currently available for nutrient analysis.

ANTHROPOMETRIC EVALUATIONS

A weight history, height, and serial weight measures are critical in assessing nutritional status and risk during pregnancy. Other anthropometric measures, such as skinfolds and arm circumference, can be used in high-risk cases to assess protein-energy reserves, undernutrition, and overnutrition.

WEIGHT HISTORY

A weight history should be done on all pregnant adolescents during their initial visit. A prenatal weight history includes the following information:

- Height.
- Current weight.
- Pre-pregnancy weight. Check perceptions of weight: Did they think they were underweight, normal weight, or overweight?
- Amount and pattern of weight gain during present pregnancy.
- Weight gain in past pregnancies. Check the amount of weight lost after pregnancy.
- Feelings about gaining weight during pregnancy. How much weight does she think she should gain? Also, check baby's father's attitude and any advice others have given them on weight gain.
- Exercise patterns prior to, and during, pregnancy: type of activity and frequency.

ANTHROPOMETRIC MEASUREMENTS

Height

Measure height in inches without shoes. The most accurate way to measure height is with the subject standing on a stationary flat surface with measuring tape attached. An attached, movable block, squared at right angles against the vertical flat surface, is brought down to the crown of the head to mark the height. Using a rod attached to a scale is inaccurate.[4]

Weight

Weight should be measured with beam scales with non-detachable weights that are calibrated every three to four months.[4] Weight should be taken with light indoor clothes with shoes and purse removed.

Skinfolds

Skinfold measurements are an indirect measurement of body fatness and energy storage; and consist of measuring with calipers a double layer of skin and subcutaneous fat at specified body sites. Commonly used sites

Table 2
Food Intake Evaluation for Pregnant Teenagers

Areas to be Evaluated	Significance
Variety of foods eaten	A varied diet is most likely to provide the 40-plus nutrients needed for good health. A variety of foods should be eaten from each of the major food groups.
Number of servings eaten from each food group	Apparent deficiencies in a food group necessitate a cross-check to determine type, quantity, and frequency of food intake. Less than 4-5 servings of milk, cheese, yogurt, or other milk products may mean insufficient calcium intake. Less than 3-4 servings of meat, fish, or vegetable protein food may mean insufficient protein and iron intake. Less than 5 servings of fruit and vegetables (1 rich in vitamin A and 2 rich in vitamin C) may mean insufficient vitamin A and vitamin C intake. Less than 5-6 servings of grain products may mean insufficient vitamin B and protein intake if eaten in combination with less than 2 servings from the meat group.
Time between meals and snacks	Long lapses may indicate inadequate food resources, possible substance abuse, or dieting. Also may be due to forgetting during the recall. Too short a time lapse may reflect excessive snacking or emotional eating.
Patient's definition of a serving	What a teen calls a serving may or may not match the "standard" serving. Examples of a single serving in the different groups are: Milk and milk products: 1 cup milk or yogurt, l-inch cube cheese; 1/2 cup ice cream or custard Protein foods: 2-3 oz hamburger or steak; 1 whole-chicken leg or breast; 2 eggs; 1 cup baked beans; 4 teaspoons peanut butter Fruits and vegetables: 1/2 cup or 1 small raw, cooked, or canned Grain products: 1 slice bread; 1 biscuit, roll, or muffin; 3/4-1 cup ready-to-eat cereal; 1/2-3/4 cup cooked cereal or pasta
Quantity and frequency with which "extras" are consumed (for example, sweets, sauces, gravies, chips, sodas, fried foods, shakes)	Too many extras may indicate that these foods are being eaten in place of more nutrient-dense foods or that too many calories are being consumed.
Beverages consumed (both with and between meals)	Failure to record beverages produces an inaccurate picture of a teen's nutrient intake. Some beverages make a significant contribution to nutritional needs (milk, juices); other beverages (soda, sweetened drinks, alcohol) primarily supply calories.
Reliance on fast foods or quick-fix meals	Excessive use of fast foods or quick-fix meals may indicate a lack of interest in, or knowledge of, meal planning, cooking, and comparison food costs. Indifference or ignorance toward the value of nutrition signals a particular need to take a close look at the nutritional adequacy of the foods served. Heavy reliance on these foods could lead to a diet low in fiber and trace elements, possibly low in vitamins and minerals, and high in sodium.

Adapted from: Mahan, L.K., & Rosebrough, R.H.: Nutritional requirements and nutritional status assessment in adolescence. In Mahan, L.K. & Rees, J.M., eds.: Nutrition in Adolescence. St. Louis: Times Mirror/Mosby, 1984.

include the triceps and subscapular areas. The triceps skinfold area is the best single site to use with adolescent females.[5] Skinfold measurements are susceptible to error, and a standardized procedure is essential for reliable results. Measurements are described in the Anthropometric Standardization Reference Manual.[6] The two major instruments available for measuring skinfolds are the Lange (Cambridge Scientific Industries, Inc.) and Harpenden (H.E. Morse Co.) calipers. Various inexpensive plastic calipers are also available and, although they are less accurate, they are suitable for clinical use.

Skinfold measurements are a useful tool for assessing underweight or overweight status of adolescents early in their pregnancy. Reference charts for adolescent females are found in Tables B-6, 7 of Appendix B. Generally, measurements below the 10th percentile indicate underweight and those above the 85th or 90th percentile indicate obesity.[7]

Monitoring of skinfolds during pregnancy may have potential usefulness in predicting high-risk pregnancies.[8] However, at this time, little is known about changes in body fat patterns during pregnancy, and no reference data is available for pregnancy.

Mid-arm Circumference

Arm circumference provides an index of body energy stores and protein mass. Although it can be used as an independent measure, it is often combined with triceps skinfold thickness to calculate both the arm muscle circumference and the areas of arm muscle and adipose tissue which are sensitive indices of body protein reserves.[6] These measurements can be calculated by either formula or with the use of nomograms.[9] Percentiles of arm circumference, arm muscle area, and arm fat area for adolescent females are found in Tables B-8,9, Appendix B. Values below the 5th percentile constitute evidence of depletion, while individuals whose measurements are between the 5th and 15th percentiles can be considered at risk for becoming depleted.[7]

Weight Assessment

Assessment of underweight and overweight status is found in Chapter 8 on "Weight Issues and Management."

LABORATORY EVALUATION

While more objective and precise data concerning nutritional status may be obtained by laboratory methods, the interpretation of this data is often difficult during pregnancy for the following reasons:

- Lack of established norms for pregnant adult women and pregnant adolescents for some of the tests.[10]
- Blood levels of most nutrients change during pregnancy. Some decrease (especially glucose, total protein, and water soluble vitamins) and some increase (especially lipids, fat-soluble vitamins, alpha and beta-globulins and some amino acids).[2]
- A need for more knowledge among the relationship of certain nutrients to pregnant and non-pregnant states.[10]

Laboratory tests done on pregnant adolescents cannot be measured against non-pregnant standards. Despite limitations, laboratory data can provide key baseline information at the beginning and throughout pregnancy.[10]

LABORATORY INDICES

The following laboratory indices are particularly relevant in assessing the nutritional status of pregnant adolescents:

- Anemia evaluation: The most common nutritional complication of pregnancy and the interconceptional period is anemia. Basic routine tests during pregnancy include measures of hemoglobin and hematocrit. Chapter 9, Table 6, provides the laboratory values indicative of deficiency of anemia of pregnancy.
- Urine evaluation: Routine testing of urine for sugar and ketone bodies will screen for latent diabetes or gestational glycosuria. For laboratory screening for gestational diabetes mellitus, see Chapter 9.

  Ketonuria in the non-diabetic is associated with fasting. The detection of ketonuria has been associated with poor pregnancy outcome. In adolescents, acetonuria (2+ or greater) was associated with a higher incidence of fetal and neonatal morbidity.[11] All pregnant adolescents should be routinely screened for acetonuria. When this is not possible on a routine basis, adolescents who are obese or who are experiencing poor weight gain should always have their urine tested for ketones.[12]
- Other evaluations: According to individual indications, tests of vitamin, mineral, and protein levels should be done.

CLINICAL EVALUATION OF NUTRITIONAL STATUS

Physical signs of nutritional deficiencies are rare in developed countries. However, clinical assessment is important in pregnant adolescents with a history of substance abuse or eating disorders or a grossly inadequate diet. It should be emphasized that the physical signs of malnutrition are non-specific; they may be related to non-nutritional factors such as poor hygiene, excessive exposure to sun, cold or wind, or they may reflect multiple nutrient deficiencies. In view of the multiple factors which may present as malnutrition, findings which suggest nutrition abnormalities should be regarded solely as cues, rather than as diagnostic signs, and must be con-

firmed by other laboratory and dietary findings. Clinical evaluation includes examination of hair, eyes, lips, tongue, teeth, gums, skin, glands, nails, and subcutaneous tissues. Table 3 shows physical signs indicative or suggestive of nutrition deficiencies.

Table 3
Physical Signs Indicative or Suggestive of Nutrition Deficiencies

Body Area	Clinical Sign	Possible Nutrient Deficiency or Nutrition-Related Condition
Hair	dry, dull, brittle, easily plucked	protein-calorie deficiency
Eyes	pale conjunctiva	iron, folate or B_{12} deficiency
	night blindness	vitamin A deficiency, niacin/ riboflavin deficiency
	angular paleprebritis (redness and fissuring of eyelid corners)	
Lips	angular stomatitis (fissuring at sides of lips - bilateral)	riboflavin, niacin, iron, and B_6 deficiency
	cheilosis (vertical cracks, swollen)	riboflavin/niacin deficiency
Tongue	glossitis (red, raw, swollen) atrophic filiform pappillae (smoothness)	niacin, folate, riboflavin, iron, B_{12}, B_6 deficiency
	magenta color (purplish red)	riboflavin
	loss of taste	zinc deficiency
Teeth	excessive caries	diet high in refined sugar
	enamel erosion	self-induced vomiting
Gums	soft, spongy, bleeding, inflamed	ascorbic acid deficiency
Skin	pallor	iron deficiency
	follicular hyperkeratosis (feels like sandpaper, looks like "gooseflesh")	vitamin A deficiency, essential fatty acid deficiency
	xanthoma	hyperlipidemia
	petechiae (black and blue marks due to skin bleeding)	vitamin C, K deficiency
	poor wound healing	vitamin C, zinc deficiency
Glands	thyroid enlarged, parotid enlarged (swollen cheeks)	iodine deficiency, protein deficiency
Nails	koilonychia spoonshaped ridged, brittle	iron deficiency
	weak, brittle	protein-calorie malnutrition
Subcutaneous tissue	significant non-dependent edema	protein deficiency

Modified from Jelliffe, D.B.: The Assessment of the Nutritional Status of the Community, World Health Organization Monograph, No. 53, Geneva, 1966 and Christakis, G. (Ed.) Nutritional Assessment in Health Programs. AJPH 63, 1973.

EVALUATION AND MANAGEMENT

Once the nutrition assessment has been completed, nutrition risk factors and the identification of overt or potential nutrition problems should be evident. For review, warning signs of nutrition problems in pregnant adolescents are listed below in Table 4.

DIETARY MANAGEMENT

All pregnant adolescents need nutrition education and individualized guidance. Figure 2 shows basic nutrition guidelines that should be followed with all adolescent, regardless of their nutritional risk. It also delineates broad principles for working with adolescents with nutritional problems, inadequate food resources, or those with sound dietary practices.

In an effort to synthesize the various parts of the assessment and management process, Table 5 depicts an example of an overall protocol for nutrition assessment and management of pregnant adolescents.

Table 4
Warning Signs of Nutrition Problems in Pregnant Adolescents

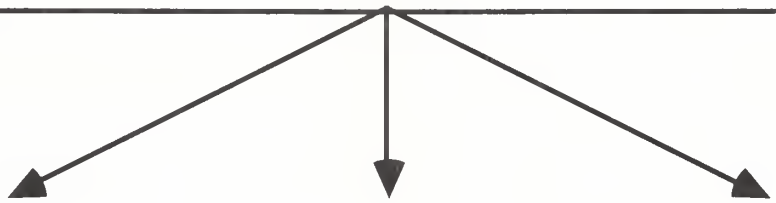
Medical/Obstetric Factors	Nutrition/Dietary Factors	Psychosocial Factors
• Adolescent with a gynecological age (chronological age minus age at menarche) of < 3	• Inadequate refrigeration or cooking facilities	• Inadequate income
• A previous pregnancy	• Lack of transportation or accessibility to grocery store	• Living alone or in an unstable family or other environment
• History of poor obstetric or fetal performance	• Cultural or religious dietary restrictions	• Little family or peer support
• Chronic systemic disease	• Frequent eating away from home	• Denial or failure to accept the pregnancy
• Past or present eating disorder: anorexia nervosa or bulimia nervosa	• Frequent snacking	• Significant emotional stress or depression
• Underweight or overweight prior to pregnancy	• Poor appetite	
• Inadequate weight gain during pregnancy	• Limited, monotonous or highly processed diet	
• Excessive weight gain during pregnancy	• Irregular meal patterns (skipping meals)	
• Persistent nausea or vomiting during pregnancy	• History of frequent dieting	
• Iron deficiency anemia or other nutritional deficiencies	• Exclusion of a major food group(s)	
• Infections during pregnancy	• Binge eating episodes	
• Heavy smoker	• Eating of non-food substances (pica)	
• Alcohol or drug use	• Nontraditional dietary pattern (i.e., vegetarianism)	
	• Overuse of nutritional supplements	
	• Heavy caffeine intake	

Figure 2

General Guidelines for Nutrition Education & Counseling of Pregnant Adolescents

Basic nutrition guidance for all pregnant adolescents[13]:

- Defining the link between food intake and weight gain to fetal growth and development.
- Dealing with issues that interfere with adequate nutrition.
- Providing support for obtaining resources.
- Providing guidance in the kind and amount of food energy to permit appropriate weight gain.
- Counseling on the selection of nutrient-rich foods.
- Reinforcing regular use of appropriate prenatal vitamin/mineral supplements.



Basic Guidelines

For teens with inadequate food resources	**For teens with dietary inadequacies, abnormal lab values or other nutrition problems**	**For teens with sound nutrition practices**
• Identify food assistance programs (Food stamps, WIC, school food programs, food shelves, food banks, church programs) • Consult or refer to a social worker to provide guidance in obtaining resources • Provide skills on how to stretch limited funds and get the most for food dollars (groceries and in restaurants). Follow-up to make sure she has received assistance • Show concern and sincerity. Let her know you want to work with her so she can feel good during her pregnancy and have a healthy baby. • Schedule follow-up appointment.	• Determine where the major nutrition problems lie. • Prioritize nutrition needs based on the most serious. • Establish a collaborative relationship with the teenager. She needs to be an active participant in goal-setting and problem-solving. • Choose goals reasonable an reachable. • Limit the number of recommendations at one time to 1-2 clearly stated suggestions that the teen agrees to try. • Schedule follow-up appointment	• Give praise and encouragement for their good habits. • At subsequent visits, check food intake, weight gain patterns, and any nutrition or dietary concerns she may have. • Dietary evaluation should be repeated at least once per trimester (e.g., 24-hour recall and food frequency questionnaire).

Table 5
Protocol for Assessment and Management of Normal Teenage Pregnancy

Initial Evaluation (if possible)

Review intake material
Review clinical data
  Height and weight
  Gynecological age
  Physical signs of health
  Expected delivery date
Review laboratory data
  Hematocrit or hemoglobin
  Urinalysis
Begin to build relationship with the client (and partner if available)
Assess clients' perspective of nutrition issues
Assess attitude about, and acceptance of, prepregnancy with and feelings about weight gain during pregnancy
Assess intake patterns using dietary methodology best suited to client and professional
Make preliminary assessment of food resources and refer to supportive agencies if necessary
Check for nausea and vomiting and suggest possible remedy
Discuss supplemental vitamins and minerals
Make initial plan that sets priorities for issues
Come to agreement with patient about any initial changes and steps to take; have client state plan as she perceives it
Determine client understanding of relation between nutrition and health

Second Visit

Check on referrals to other agencies
Discuss results of initial evaluation and suggest any changes necessary in dietary patterns (use printed materials as appropriate)
Do any further investigations when necessary
Laboratory studies
  For specific diagnosis of anemia:
  Protoporphyrin heme or serum ferritin
  Serum or red cell folate
  Serum vitamin B_{12}
  Further probing of dietary habits if necessary
Monitor weight gain; discuss projected weight gain for following visit and total for gestation
Assess and address issues affecting nutritional status in order of priority for the individual
- activity level
- appetite changes
- pica, food cravings and aversions
- allergies/food intolerances
- supplementation practices (prescribed and self-selected)

Subsequent Visits

Monitor and support appropriate weight gain: include discussion of fitness and encourage habitual safe exercise.
Support upgrade in nutritional pattern in support of the woman and the developing infant; augment knowledge of principles of nutrition; continue to address issues affecting nutritional status.
Check for heartburn, small food-intake capacity, and elimination problems; suggest dietary interventions.
Begin preliminary discussion and comparison of advantages/disadvantages of breast feeding and formula feeding.

Final Prenatal Visit(s)

Discuss infant feeding if client will keep infant
If breast feeding is chosen, provide preliminary guidance about breast feeding practices
If formula feeding is chosen, discuss product selection and preparation; define important details about feeding techniques

Postpartum Visits

Help client to understand safe methods of managing weight following delivery
Review infant feeding practices and infant growth; provide assistance when problems are identified

Source: Modified from Rees, JM and Worthington-Roberts, BW: Adolescence, Nutrition, and Pregnancy: Interrelationships. In Mahan, LK and Rees, JM: Nutrition in Adolescence. St. Louis, Times Mirror; Mosby, 1984. pg. 241.

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Resources

Sources of Food Models

Iwasaki Images of America
2188 West 190th Street
Torrance, CA 90504

Nasco
1524 Princeton Avenue
P.O. Box 3837
Modesto, CA 95352

National Dairy Council
6300 North River Road
Rosemont, IL 60018

Nutrition Consulting Enterprises
268 Centre Street
Newton, MA 02158

8

WEIGHT ISSUES AND MANAGEMENT

Elizabeth J. Gong, M.P.H., M.S., R.D.

BACKGROUND INFORMATION

Weight Gain And Pregnancy Outcome

- An important predictor of the outcome of pregnancy is maternal weight gain.
- Total weight gain during pregnancy is a major factor influencing infant birthweight.[1, 2]
- Increased risk of low birthweight infants is associated with inadequate prenatal weight gain, particularly in mothers with low prepregnancy weight.[1-3]
- As young adolescents have the highest risk of bearing low birthweight infants and low birthweight is a major determinant in infant morbidity and mortality,[4] adequate prenatal weight gain may be particularly important in this population.
- Mothers under 20 years old with increased prenatal weight gain substantially decreased the risk of low birthweight delivery. As weight gain increased from less than 16 pounds up to 35 pounds, fetal death rates declined from 8.1 to 3.9 per thousand live births.[5]
- In order to deliver a seven-pound infant, younger (13- to 16-year-old) mothers may need to gain more weight (35 pounds) than older (17 years and older) mothers (22 pounds).[6]

Table 1
Factors Influencing Pregnancy Outcome

- Gestational age
- Gynecologic age/growth potential
- Total maternal weight gain
- Prepregnancy weight status
- Pattern of weight gain
- Substance use: cigarettes, drugs, alcohol
- Sexually transmitted diseases
- Stress

Factors Influencing Pregnancy Outcome

Maternal weight gain is one of the strongest independent predictors of infant birthweight. However, it is important to remember that many other variables influence pregnancy outcome. Table 1 summarizes some of the factors influencing pregnancy outcome.

- Gestational age is a strong predictor of infant birthweight.[4] The duration of the pregnancy will have an impact on the total amount of weight gained.
- Gynecologically younger adolescents who become pregnant may still be growing.
  - Some immature pregnant adolescents may need to gain more weight than adult mothers due to growth and may compete for nutrients with their fetuses.[6,7]
  - An adolescent who becomes pregnant within two or three years after menarche may be at nutritional risk because her own needs for growth and development may be compromised by the extra demands on her system from the growth needs of the fetus.[8]
- Total maternal weight gain is positively related to infant birthweight. It also interacts with many of the other variables that influence pregnancy outcome.
- Maternal pre-pregnancy weights contribute significantly to the wide range observed in prenatal weight gain.
  - Low pre-pregnancy weight plus low prenatal weight gain is associated with the highest incidence of low birthweight infants.[1, 2] Particularly affected are women who start their pregnancy underweight.[1,2,9] The incidence of low birthweight babies decreases as adolescents approach 140% of their ideal pre-pregnancy weight at term.[10]
- A progressive steady increase in weight is recommended during pregnancy. During the first trimester, the weight gain is usually slow, with a fairly linear pattern occurring during the second and early third trimesters. The rate usually decreases toward the end of pregnancy.[16]

- Moderate use of tobacco, alcohol, opiates, and cocaine has been associated with increased rates of obstetrical complications (including spontaneous abortions and prematurity) and fetal growth retardation.[5,17-19]

Weight Gain Recommendations

- Weight gain recommendations for adolescents are often based on references for adult women, but the suitability of this has been questioned, particularly with young adolescents.[21, 22]
- Precise recommendations for pregnant adolescents remain controversial; however, most recent studies show an average total weight gain of 30 to 40 pounds,[10, 21, 23-25] with the lowest rates of low birthweight associated with gains of 26 to 36+ pounds.[5] When adolescents gain 21 to 25 pounds, the rate of low birthweight drops to 7.4% (from 15.2% with weight gain between 16 and 20 pounds); when weight gain increases to 26 to 35 pounds, the incidence of low birthweight decreases to 6.3%.[5]
  - At this time, due to lack of research data, optimal weight gain patterns for pregnant adolescents are not known. An expert panel[26] recently made recommendations on desired prenatal weight gain for underweight and normal weight adult women. They felt the weight gains recommended for adults were appropriate for adolescents. The panel identified 3500 to 3999 grams as the desired birthweight range, which is associated with the lowest perinatal mortality rates for infants. Prenatal weight gains of 30-35 pounds were identified for women with normal prepregnancy weights. Weight gains of 30-35 pounds plus the prepregnancy deficit in weight for height was identified for women entering pregnancy underweight.
- The possible negative consequences of excessive weight gain should not be ignored. It may increase the risks of cephalopelvic disproportion and Caesarian section.[27] It may also increase fat stores, predisposing the mother to obesity if these stores are not used for fetal growth or lactation.

ASSESSMENT

Prepregnancy Weight

- Prepregnancy weight is used to calculate total weight gain during pregnancy.
- Prepregnancy weight is most often obtained retrospectively from patient recall. Measured weight is optimal, but often unavailable. As a group, adolescents with an identifiable source of health care are able to accurately estimate their prepregnancy weights: however, individual estimates may vary.[28]

Assessment Of Weight Status

- Since prepregnancy weight status is an indirect indicator of maternal energy reserves and contributes significantly to the wide range observed in prenatal weight gain, assessing weight status is important.
- Good reference data for assessing weight status for adolescents is lacking. The recommended reference for adolescents in the U.S. has been the National Center for Health Statistics (NCHS), Height and Weight for Youths 12-17 Years, United States.[29] These percentiles provide a distribution based on a large cross-sectional national probability sample. However, there are limitations to the NCHS charts due to their cross-sectional nature and the wide variability of growth in adolescents at any particular chronologic age.

  Closer examination of the NCHS Height and Weight for Youths 12-17 Years reveals that the data underestimates the standard weight of younger adolescents (particularly 12- and 13-year-olds). For example, using the NCHS reference data for some ages would miss many adolescents who may be underweight (for the 5 foot, 8 inch 12- and 13-year-old, underweight would be less than 113 and 105 pounds, respectively). Furthermore, one would expect a 13-year-old to weigh more than a 12-year-old. Most clinicians would agree the standards regarding these weights are far too low.

  Until better reference data is available for pregnant adolescents, the 1959 Metropolitan Life Table (Table 2) may be used to assess prepregnancy weight status in clinical settings. Although the weights are designed for adults 25 years and older, they are easy, practical to use, and tend to give a more conservative, heavier weight goal. It should be remembered that any height/weight tables are merely gross estimates and should be used with caution. The Metropolitan Life reference should give an approximate goal. In Table 2, young women with small body frames would be assessed with the lower ranges; large-framed young women would be assessed with the higher end of the range.

Factors To Assess For Weight Management

Obtaining the information listed in Table 3 will be helpful in weight management during pregnancy.

- Height is most accurately measured with the subject standing on a stationary flat surface with her back against a vertical surface, with measuring tape attached. An attached, movable block, squared at right angles against the vertical flat surface, is brought down to the crown of the head to mark the height.[30]
- It is recommended that weight be measured with beam scales with non-detachable weights that are calibrated every three to four months.[30]
- Other anthropometrics can be measured to assess nutritional status and weight management. Mid-upper

Table 2
Assessing Prepregnancy Weight Status

Height (no shoes)		Weight Status Category Weight in pounds (light indoor clothing)			
Feet	Inches	A Under	B Normal	C Over	D Obese
4	9	92 or less	93-113	114-134	135 or more
4	10	94 or less	95-117	118-138	139 or more
4	11	97 or less	98-120	121-142	143 or more
5	0	100 or less	101-123	124-146	147 or more
5	1	103 or less	104-127	128-150	151 or more
5	2	106 or less	107-131	132-155	156 or more
5	3	109 or less	110-134	135-159	160 or more
5	4	113 or less	114-140	141-165	166 or more
5	5	117 or less	118-144	145-170	171 or more
5	6	121 or less	122-149	150-176	177 or more
5	7	124 or less	125-153	154-181	182 or more
5	8	128 or less	129-157	158-186	187 or more
5	9	131 or less	132-162	163-191	192 or more
5	10	135 or less	136-166	167-196	197 or more
5	11	139 or less	140-171	172-202	203 or more
6	0	142 or less	143-175	176-207	208 or more

Technical Notes: Weight for height ranges are calculated from the 1959 Metropolitan Height and Weight Tables for Women over the age of 25 years. A midpoint value was determined from the range of weight for height for women of "medium frame". The cut-point for underweight women is designated as a weight for height that is more than 10% below the midpoint. The normal weight range is calculated as plus or minus 10% of midpoint for each height. The overweight range is calculated as greater than 10% through 30% above the midpoint of weight for height. The cut-point in weight for the obese category is calculated as a weight for height that is more than 30% above the midpoint of weight for height.

Therefore, underweight is defined as a weight for height of < 90% of the midpoint, normal weight as 90-110%, overweight as 110-130%, and obese as > 130% of standard weight.

Source: Adapted from the Metropolitan Life Insurance Company, Statistical Bulletin No. 40, 1949. Table developed by J.E. Brown, Healthy Infant Outcome Project, University of Minnesota.

arm circumference gives an assessment of lean body mass.

- Skinfolds are used to assess energy or fat stores. The triceps skinfold is the most commonly measured site, due to its accessibility and the availability of references. The Anthropometric Standardization Reference Manual[31] gives the procedure for measuring skinfolds.
  - Serial measurements may not be necessary for all adolescents, but they may be helpful in certain high risk circumstances. Serial skinfolds during pregnancy may provide an additional objective indicator of nutritional status. Some health care providers welcome additional objective data to correlate with dietary, clinical, biochemical, and other anthropometric assessments in the evaluation of nutritional status.
  - Documented sequential changes, such as loss of fat stores with time, have often been helpful in confirming the clinical diagnosis.
  - Preliminary studies show that skinfolds measured during the course of pregnancy may have potential use in predicting high risk pregnancies, particularly the delivery of low birthweight infants.[32-34]
- Getting a good weight history and the adolescent's concept of body image are important. Building trust and a good rapport with the adolescent will be helpful.
- Activity and exercise level should be obtained. To get a general idea of activity level, ask the adolescent what she does on a typical day. Getting an exercise recall of the past seven days will help assess exercise level (see Chapter 11).
- The nutritional assessment should include a dietary history, 24-hour recall, use of alcohol, drugs, cigarettes, as well as any discomforts experienced with the pregnancy (see Chapters 7 and 12).
- Assess the adolescent's support system and how it can be used to help weight management. Food resources may be a determining factor. Check for a stable food supply, as well as the adequacy of facilities (such as

Table 3
Factors to Assess For Weight Management

Age	Chronologic age Gynecologic age
Anthropometric	Height Prepregnancy weight Prepregnancy weight for height Weight Midarm circumference Triceps skinfolds
Weight History	Weight and dieting history Recent rapid growth period Weight gain attitudes Preferred body weight History of eating problems
Activity	Activity level Exercise habits
Health Practices	Eating pattern Use of alcohol, drugs, cigarettes Nausea/vomiting Heartburn or constipation Pica
Psychosocial	Support from partner, family, friends Acceptance of pregnancy Emotional stress Food needs and resources

refrigeration). To work successfully with the adolescent, one needs to ascertain the degree of her emotional and social stresses. Acceptance of the pregnancy is an important issue to discuss.

MANAGEMENT

Weight Gain Recommendations For Pregnant Adolescents

- Although the optimal weight gain during pregnancy continues to be discussed, recommendations may be made for pregnant adolescents based on present knowledge. Table 4 summarizes approximate ranges of weight gain recommended for different prepregnancy weight categories. Because of the wide variation in weight gain observed during healthy pregnancy and the need for more study, it is recommended that ranges of weight gain be stressed, rather than a single, absolute weight.
  - The ranges in Table 4 are within the adult recommendations of an expert panel[26] and consider the larger weight gains reported in adolescents, as well as favorable outcome. These recommendations should be used as guidelines and should be revised as new findings indicate.
  - For the adolescent who was underweight prior to conception, the average weight gain of 30-35 pounds is recommended plus an additional amount to make up her weight for height deficit. This may result in a better weight range recommendation than the general one in Table 4.

Table 4
Prenatal Weight Gain Recommendations for Adolescents

Prenatal Weight Status	Recommended Range
Underweight	35 - 40 pounds
Average Weight	30 - 35 pounds
Overweight	20 - 25 pounds

Pattern Of Weight Gain

- The pattern and amount of weight gain are critical tools in prenatal assessment as they reflect the adequacy of the caloric intake of a pregnant adolescent.[16]
- The weight gain curve during pregnancy is usually slow during the first trimester, with a fairly linear gain during the second and early third trimesters and a decrease in rate toward the end.[16]
- The use of weight gain charts is important in providing nutritional care during pregnancy. An example of a weight gain chart that can be used with adolescents is shown in Figure 1. This chart, developed by Dr. Judith Brown for women of all ages, is tailored to pregravid weight and includes weight ranges.
- Allowing adolescents to follow their own weight gain on the weight gain grid may give them a greater understanding of their own pattern.

Management Of Inadequate Weight Gain

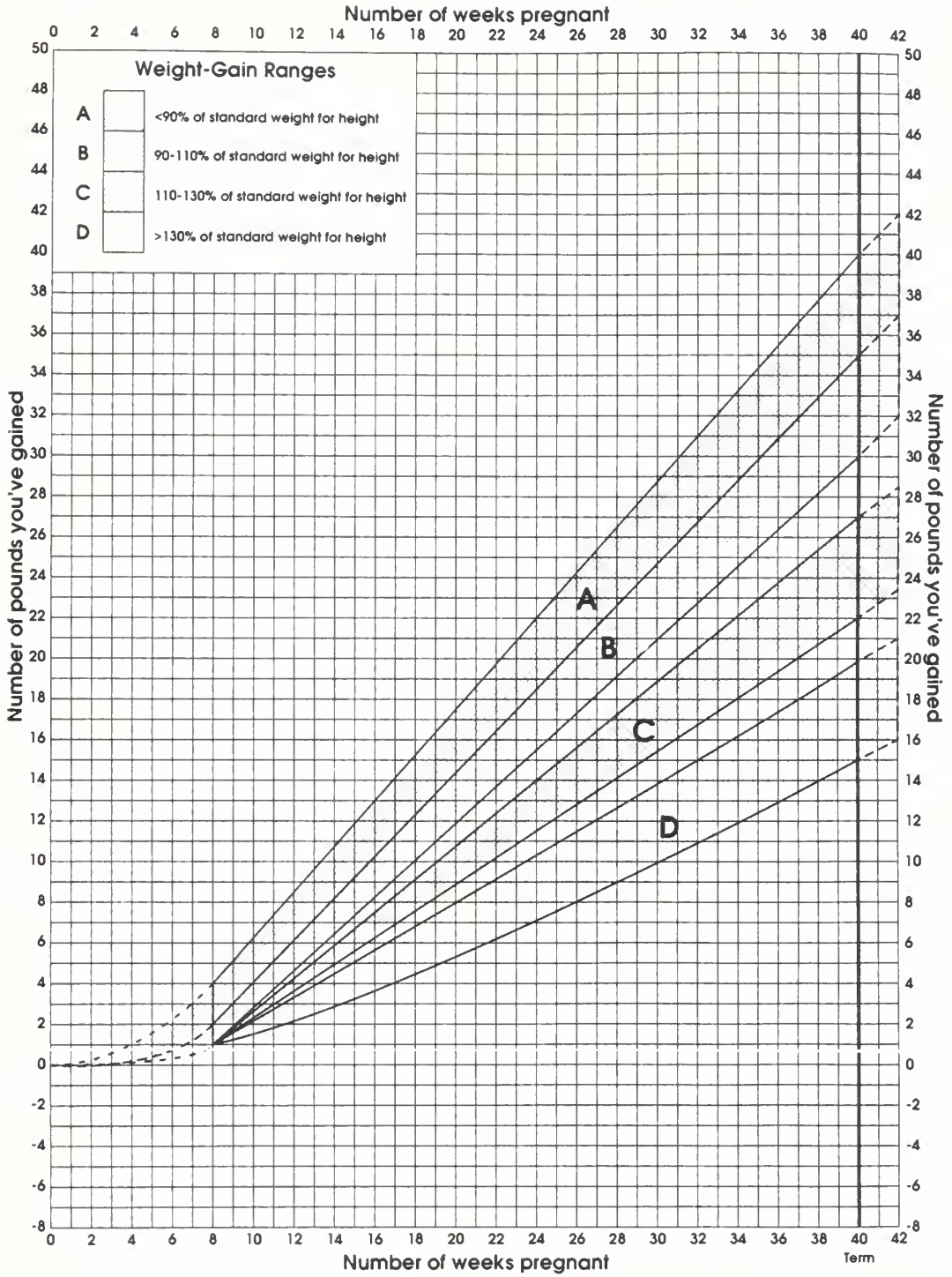
Although each adolescent should be assessed on an individual basis (using the grid, Figure 1, and recommended range of weight gain), inadequate weight gain may be arbitrarily defined as less than two and one-half pounds per month during the second and early third trimesters. Table 5 shows recommended areas to check with adolescents who show inadequate gain during pregnancy.

Management Of Excessive Weight Gain

Excessive weight gain may be defined as gain of seven and one-half or more pounds per month in the second and third trimesters. The recommended areas to assess in adolescents with excessive weight gain are summarized in Table 6.

Figure 1
Prenatal Weight Gain Grid

Name: _____ Weight-Gain Range: _____



Judith Brown, Healthy Infant Outcome Project, University of Minnesota

Table 5
Areas of Recommended Investigation in Cases of Inadequate Prenatal Weight Gain

- Nausea/vomiting, other discomforts
- Attitude towards eating
- Food availability
- Possible eating disorder
- Stress, depression, social isolation
- Activity level
- Smoking
- Use of alcohol and drugs
- Urinary ketones

Table 6
Areas of Recommended Investigation in Cases of Excessive Prenatal Weight Gain

- Attitude towards eating
- Stress, depression, social isolation
- Food quality
- Excessive fluid retention

COUNSELING

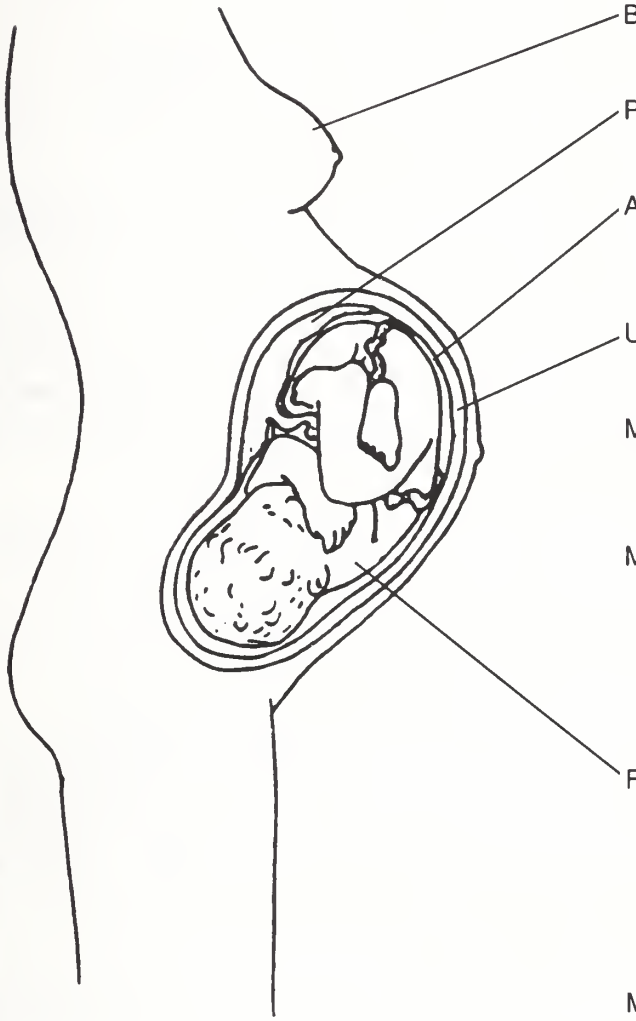
General Counseling Recommendations for Weight Management

- It is very important to individualize the counseling for each adolescent. Successful behavior change (see Chapter 14, Strategies for Dietary Change) must take into account the normal dietary practices of each adolescent. Stress the selection of nutritionally adequate foods within the range of the teen's food choices.
- Adolescents are very concerned about physical appearance, body image, and body size. Slimness is valued in our society. Many teenagers are weight conscious and preoccupied with trying to be slim. They may intentionally restrict their food intake because of a "fear of getting fat." Assess the adolescent's view of the pregnancy. Is it one of getting fat rather than the appropriate physical changes of pregnancy? Help the teen to accept the physical changes of pregnancy.
- Give the adolescent the responsibility for her own actions. It is important that she plan how she will change behavior. Help the teen plan menus, meals, and snacks that will meet the recommendations.
- Fast-foods and convenience foods are part of the teenage lifestyle. Educate the adolescent on how to make wise food choices among the many fast and convenience foods available.
- Discuss the components of weight gain. Some adolescents think that all they need to gain is the seven or eight pounds for the baby; or that after the gain of seven or eight pounds for the baby, the rest of the weight goes to fat. Be concrete and use a chart that graphically illustrates where the weight gain goes (Figure 2).
- Point out that good weight gain is important for both the baby's health and her health. Pregnancy may provide a good time to encourage good habits for the baby's sake. However, depending on the adolescent's stage of development, it may be important to focus on the teen and reinforce the advantages good weight gain will have on her (for appearance, for health, for feeling good). Display pictures and posters of healthy, attractive pregnant adolescents and babies.
- Use pictures to show the stages of growth and development of the fetus during pregnancy, reinforcing the importance of good weight gain to achieve each stage.
- Plot the adolescent's weight change on a grid (Figure 1). Discuss the expected and recommended weight gain during pregnancy in terms of a range. Reinforce the importance of a slow and steady increase each week.
- Provide positive reinforcement for adequate weight gain and good nutritional practices.

Inadequate Weight Gain

- Stress that women who do not gain enough weight are more likely to have small babies, premature babies, or babies with health problems.
- Assess dietary history and 24-hour recall. Use a "Sample Food Plan" (See Appendix A) to show the teenager the recommended intake and how much food it takes to achieve adequate weight gain. Compare her intake to the recommended intake. Get the teenager to problem-solve and show where she can make changes.
- Check activity and exercise habits. Decreasing her activity level and increasing her food intake may be the best plan until she has achieved a good weight gain.
- Provide, and go over with her, a printed list of energy-rich, nutritious snacks. Because most adolescents associate "calories" with unwanted weight gain, it is best to avoid referring to "calories" and instead refer to the particular foods as energy rich. See Table 7 for energy rich suggestions.
- Anticipate the times when the teenager might be hungry. Plan a definite eating schedule. Be sure to keep lots of nutritious, easy-to-prepare favorite foods around. Keep notes, handouts, pictures, etc. pinned or taped up around the house as reminders.
- Aim for three meals a day and two to three snacks a day. These do not have to be large. Encourage the

Figure 2
Components of Average Weight Gain During Normal Pregnancy
(40 weeks gestation)



Breasts	1-3 pounds
Placenta	1-1/2 pounds
Amniotic Fluid	2 pounds
Uterus	2-3-1/2 pounds
Maternal Body Fluid	3 pounds
Maternal Blood	3-1/2 pounds
Fetus	7-8-1/2 pounds
Maternal Tissues Stores	8-10 pounds
Total	26-35 pounds

Source: Adapted from Worthington-Roberts, B.S.: Nutritional issues related to pregnancy. In: Worthington-Roberts, B.S.: Contemporary Developments in Nutrition. St. Louis: The C.V. Mosby Company, 1981.

Table 7
Energy-Rich Foods

- Milk-fruit shakes, smoothies, yogurt drinks
- Yogurt with fresh or dried fruit and nuts
- Ice cream, frozen yogurt
- Custard, puddings
- Cheese on crackers or toast
- Sandwiches: cheese, luncheon meats, cold meat leftovers, tuna, chicken, egg salad
- Peanut butter on bread, crackers, muffins, celery, banana, apples; other meat or bean spreads
- Dried fruit/raisins, nuts and seeds
- Fresh fruit and fruit juices
- Breads, muffins, quick breads (banana, pumpkin), rolls, bagels, crackers
- Cookies such as oatmeal, peanut butter, fig; graham crackers
- "Instant" breakfast drinks are a good supplement that are easy to prepare
- Pizza, grilled cheese
- Fortify foods with dry milk powder
- Soups, especially milk-based, split pea, lentil

adolescent to eat often. Many teenagers skip breakfast. Reinforce the idea of eating food in the morning to refuel after the nighttime fast. Suggest alternatives to the typical breakfast foods. Try pizza, peanut butter on toast, sandwiches, smoothies, and leftovers.

- Full-feeling, poor appetite, and not feeling hungry may be problems. Suggestions that might be helpful include:
  - Eat when relaxed.
  - Wear comfortable, loose-fitting clothing (especially during and after eating).
  - Eat smaller meals or snacks of energy-rich foods more frequently throughout the day.
  - Try not to fill up on liquids with meals. Drink afterwards.
  - Keep lots of easy-to-prepare, favorite foods around, as well as foods easy to keep while away from home (cheese and crackers, peanut butter sandwich, fresh fruit, muffins, bagels, etc.).
- Explore with the adolescent the reasons for her lack of appetite and her inability to gain weight. Check for reasons such as stress, which can upset the stomach. Isolation, denial of the pregnancy, and depression can

Table 8
Suggestions to Decrease Calories and Include Nutritious Foods

- Substitute skim or lowfat milk for whole milk (if skim or lowfat milk is unacceptable, encourage the adolescent to mix them with whole milk, gradually increasing the amount of skim/lowfat milk).
- Increase the use of fresh fruits and vegetables instead of those prepared with sauces, butter, oil, or sugar.
- Increase the use of high fiber, low-calorie foods, such as whole grain breads and crackers, carrots, apples, etc.
- Reduce the amount of butter, margarine, mayonnaise, and salad dressing.
- Decrease the amount of fried foods like potato chips (and other snack chips), french fries, onion rings, pork rinds, fried chicken, etc.
- Reduce the amount of sugar, jams, and jellies.
- Switch to unsweetened (from presweetened) breakfast cereals.
- Prepare meats and fish by baking, broiling, boiling, stewing, or poaching — without adding fat, gravies, and sauces; avoid frying.
- Decrease sweets such as candy, cakes, pies, cookies, doughnuts, sweet rolls, soda, Kool-Aid, ice cream; substitute with low-calorie foods the teen is willing to eat (fresh fruit, mineral water, etc.). If sweets are eaten, have small portion sizes.
- Drink lots of water; substitute flavored mineral water or juice for sodas. Artificially-sweetened sodas, in small amounts, may be fine.
- Watch portion sizes, as well as frequency of intake of foods that may be problematic.
- The idea of caloric density and nutrient density (Table 9) may be helpful. Discuss increasing the amount of foods with more nutrition and decreasing the foods with lots of calories. Focus on what foods the adolescent is willing to eat more of, rather than which foods to avoid.
- Keep lots of nutrient-dense, lower calorie foods ready and available. Keep high-calorie foods "out-of-reach" and/or out of the house.

Table 9
Nutrient Density Sources of Snack Foods

Food Item	Amount	Nutritional Score*
Raw carrot	1 carrot	120
Cantaloupe	1/4 melon	90
Tomato juice	6 oz.	62
Fresh orange	1 orange	43
Celery	1 stalk	38
Fresh apricots	3 apricots	33
Fresh peach	1 peach	27
Skim milk	1 cup	20
Plain yogurt	1 cup	15
Swiss cheese	1 oz.	11
Chicken (roasted without skin)	3 oz.	11
Banana	1 banana	9
Sunflower seeds	1 oz.	9
Rye wafers	4 wafers	5
Frankfurter	1 frank	5
Ice cream	1/3 cup	5
Peanut butter	2 Tbsp.	5
Graham crackers	2 squares	2
Doughnuts	1 doughnut	2
Brownies	1 brownie	2
Fudge	1 oz.	1
Assorted cookies	2 cookies	1
Marshmallows	1 oz.	1
Cola		0

*Based on the Index of Nutritional Quality (INQ) which measures the ratio of nutrients to total calories. Foods with a high nutrient density score are generally high in nutrients and low in calories. Foods high in fats and sugars will have a lower nutrient density score since fats and sugars add calories without adding nutrients.

Source: Marino, D.D. and King, J.C. Nutritional concerns during adolescence. *Pediatric Clinics of North America,* 27:125, 1980.

affect eating patterns. Check sleeping patterns (is the adolescent sleeping through snacks and meal times?). Some teens may want to hide the pregnancy and therefore limit weight gain.

Excessive Weight Gain

- Review the problems associated with too rapid, excessive weight gain during pregnancy.
- Reinforce that pregnancy is not a time to go on a "diet." Promote healthful, nutrient-dense, lower-calorie foods.
- Assess dietary history and 24-hour recall. Have the adolescent identify the high-calorie foods from the recall. Then identify the low-calorie foods. Help her plan which changes she is willing to make to decrease the amount/frequency of high-calorie foods and increase low-calorie, nutrient-dense foods. Table 8 provides suggestions to decrease calories and include nutritious foods.
- Check activity and exercise pattern. Review and encourage the adolescent to increase activity level. Plan goals that are realistic.
- Identify habits that make weight management difficult. Give the adolescent responsibility in deciding which changes to make.
- Encourage the teenager to try not to skip meals, particularly breakfast. Many individuals who are watching their weight skip meals, but then get so hungry they over-compensate when they do eat. High-calorie foods are often used in the "binge."
- Anticipate problem times. Plan ahead how to deal with these times by identifying strategies to change the "target habit."
- Check for reasons for overeating, such as stress, isolation, and depression. Assess for hyperemotional state eating (does she eat when she is bored, tired, angry, feeling down, etc.).

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9

NUTRITION-RELATED SPECIAL CONCERNS OF ADOLESCENT PREGNANCY

Irene Alton, M.S., R.D. & Kristi Mulchahey, M.D.

PICA

Pica, or abnormal cravings resulting in regular, compulsive ingestion of inappropriate substances, may occur in pregnancy. Items consumed by those practicing pica vary according to individual preference and may range from food products (e.g., flour) to highly toxic substances such as mothballs.

Although consumption of clay, dirt, and laundry or cornstarch has frequently been cited among Black populations, pica may occur in pregnant women of any age, race, culture, geographic area, or socioeconomic status.[1] Despite theories based on psychosocial, physiologic, or cultural factors, the etiology of pica remains unknown. Iron deficiency anemia and preeclampsia appear to occur more frequently in those practicing pica. The relationship of these conditions to pica, however, remain unclear.[2]

RISKS

The potential adverse effects of pica in pregnancy are dependent on the type and quantity of substance ingested. Examples of pica substances and potential concerns are listed in Table 1.

Additional Concerns Of Pica During Pregnancy

- Constipation or fecal impaction, as well as gastric or intestinal obstruction, may result from pica substances. In extreme cases, peritonitis or death may occur.[1]
- Low intakes of iron, zinc, energy, and other nutrients may occur as pica substances displace nutritious foods in the diet. Nutrient deficiencies or inadequate weight gain may result.
- Malabsorption of minerals resulting from binding by pica substances may further contribute to nutrient deficiencies.
- The energy content of ingested clay, laundry starch, cornstarch, or flour, which may be as high as 1000 kcal/day, may result in excessive weight gain.
- Tooth fractures may occur from chewing hard substances while the citric acid content of lemons may cause erosion of dental enamel.[3] Ice eating may

Table 1
Potential Adverse Effects of Pica in Pregnancy

Pica Substance	Content	Potential Adverse Effects
Baking Soda	Sodium, alkali	Excess sodium load, alkalosis
Chalk	Calcium, alkali	Hypercalcemia, alkalosis
Cigarette butts	Nicotine	Nicotine toxicity
Clay, dirt	Bacteria/parasites; mercury/lead	Bacterial/parasitic infections, mercury or lead toxicity
Paint chips, colored paper (lead-containing)	Lead	Lead toxicity
Coffee grounds	Caffeine	Caffeine toxicity
Moth balls and toilet bowl freshener	Naphthalene/paradichlorobenzene	Toxicity Hemolytic anemia

contribute to tooth decay by contracting metal fillings which may then allow entry of bacteria into the mouth.

- Congenital lead poisoning in infants of women ingesting lead-containing substances, as well as transplacental poisoning and hemolytic anemia resulting from maternal intake of paradichlorobenzene, have been observed.[2]

FOOD CRAVINGS AND AVERSIONS

Cravings, or a compulsive desire for certain foods, as well as aversions or a repulsion of foods not previously disliked, have been described in pregnancy. Although highly individual, food cravings and aversions which have been most frequently reported[4] are listed in Table 2.

Food cravings or aversions appear to be emotionally-based. They do not appear to have a negative effect on nutrition status unless an excessive energy intake or interference with a balanced nutrient intake results.

Table 2
Food Cravings and Aversions

Cravings	Aversions
Sweets	Meats
Dairy products	Coffee
Fruits	Alcoholic beverages

ASSESSMENT

Embarrassment may cause the adolescent to be reluctant to admit to pica or food cravings and aversions.

In a non-judgmental and sensitive manner, the practice of pica and food cravings or aversions should be assessed in all adolescents at the initial prenatal visit. This assessment can be done by a nutritionist, nurse, physician, nurse-practitioner, or health educator.

The questions may most easily follow those related to the adolescent's usual food intake. For example:

- What foods do you especially like and eat a lot of since your pregnancy?
- What foods are you finding hard to eat since becoming pregnant?
- Some people eat things when they are pregnant that are not usually considered food. How often do you eat things like ice, cornstarch or laundry starch, baking soda, etc.?

COUNSELING

Since some forms of pica may be associated with emotional well-being[5] and may have been practiced in families for generations, promoting behavioral change in the adolescent admitting to pica may be challenging.

- Discuss concerns about pica in simple, concrete terms.
- Advise avoidance of inappropriate substances.
- Encourage healthful alternatives and a nutritionally balanced diet.
- Suggest substitutes, when appropriate, such as sour pickles, raw vegetables, a cinnamon stick to chew on, etc.
- Refer for psychosocial counseling, if indicated.

FOLLOW-UP

At subsequent visits:

- Reassess pica practices
- Praise positive changes made
- Establish new goals for behavioral change

ANEMIA

IRON DEFICIENCY

Iron deficiency anemia, frequently reported in adolescent pregnancy,[1] is attributed to the following conditions:

- **Physiologic changes in blood volume:** Beginning at approximately six weeks and peaking at 34 weeks gestation, maternal plasma volume increases to 50% above pre-pregnant levels. A later and disproportionate 20% rise in red cell mass results in "dilution" of circulating red cells[2] and a decline in hemoglobin level.
- **Increased iron demands:** The total iron requirement of a singleton pregnancy is approximately 1200 mg or 4.3 mg per day of elemental (absorbed) iron. This estimate, summarized in Table 3, is based on the average iron content of the fetus, placenta and cord blood, fetal hemoglobin synthesis, and expanded maternal red cell mass. Normal iron excretion and blood loss at delivery are considered.[3, 4]
- **Low or absent iron stores:** Many adolescents are likely to enter pregnancy with insufficient iron reserves which may result from low dietary intakes or

Table 3
Iron Requirements in Pregnancy (mg)

Fetal, placental iron content	300
Maternal red cell expansion	500
Maternal excretion (sweat, urine, feces)	200
Blood loss at delivery: vaginal	200
(C-section)	(400)
	1,200

iron demands of recent growth. Heavy menstrual periods, substance abuse, or a previous pregnancy, particularly if multiparous or closely spaced, may also contribute to a negative iron balance. One study of storage iron in young women found average levels to be 300 mg, while one-third had no iron reserves.[4]

- Marginal iron intakes: Despite an increased absorption of iron in pregnancy, the diets of pregnant adolescents are likely to supply less than 10 mg of iron per day (1-2 mg of elemental iron).[5] Dietary iron intakes may be further compromised by discomforts such as nausea, vomiting, or heartburn.

RISKS

Iron deficiency anemia is associated with insufficient production of hemoglobin and a reduced capacity of the blood to carry oxygen to body cells and tissues. A lack of iron-containing enzymes and other compounds may also occur. Iron deficiency anemia in pregnancy may increase perinatal morbidity as summarized in Table 4.

- Higher rates of prematurity and the delivery of low birth weight infants may be associated with maternal iron deficiency.[6,7] If underweight status at conception and anemia occur simultaneously in pregnancy, there may be a five-fold increased risk for the delivery of an infant weighing less than 2500 grams.[8]
- Postpartum hemorrhage, as well as decreased tolerance of normal blood loss at delivery, may increase the risk for transfusion therapy.[9]
- The adolescent may experience fatigue, depression, irritability, dizziness, headache, and shortness of breath as a result of iron deficiency anemia.
- Maternal anemia and low iron stores have been associated with decreased fetal iron reserves, total body iron content, and reduced circulating hemoglobin mass.[10,11]

Table 4
Potential Risks of Iron Deficiency Anemia in Pregnancy

- Prematurity
- Low birth weight
- Postpartum hemorrhage
- Decreased maternal well-being
- Maternal transfusion
- Compromised fetal iron status

Prevention

- To prevent iron deficiency anemia and maintain iron stores, as well as to promote adequate fetal storage of iron, iron supplementation is clearly indicated in adolescent pregnancy.
  - Although iron needs are greatest during the second half of pregnancy, a supplement providing 30-60 mg of elemental iron is recommended throughout pregnancy (Table 5).[12]
  - This dosage is most conveniently provided in a standard prenatal vitamin. However, the relatively large size of these supplements may limit compliance in many adolescents who may complain of difficulty swallowing them. If needed, an iron tablet or liquid iron may be used (Table 5).
  - Although food may decrease iron absorption from supplements by as much as 60%,[13] taking them with meals will minimize gastrointestinal discomfort. A moderate increase in dietary fiber is recommended to prevent constipation which may be associated

Table 5
Examples of Iron Supplements for Pregnancy

Supplement	Elemental Iron	Recommended Dosage(prevention)*	Treatment*
Ferrous fumarate 195 mg	65 mg	1 qd	1 tid
Feostat 100 mg (chewable)	33 mg	1 qd	2 tid
Ferrous gluconate 300 mg	35 mg	1 qd	2 tid
Ferrous sulfate 325 mg	60 mg	1 qd	1 tid
Ferrous sulfate liquid 200 mg (5 ml)	44 mg	1 tsp qd	1-1/2 tsp tid

*If prenatal vitamin not taken

with iron preparations. Since milk reduces iron absorption, other liquids should be used to take iron preparations.[14]

- Explain the importance of taking supplements and monitor compliance at each visit.
- Iron is not recommended in adolescents with sickle cell anemia (unless there is co-existing iron deficiency) since it may contribute to iron storage disease.[15]

- The hemoglobin level or hematocrit should be monitored frequently (e.g., monthly) in pregnant adolescents. Desirable hemoglobin ranges are >12.0 g/dl (hct >36%) during the first trimester and >11.0 g/dl (hct >33%) during the remainder of the pregnancy.[4] Normal hemoglobin levels, however, may be approximately 1.0 g/dl lower in Blacks.[16]
- Foods of high iron content (see Appendix A), as well as meats and vitamin C-containing foods and beverages which appear to enhance iron absorption, will also help to maintain iron sufficiency in pregnancy.

Assessment

Approximately 90% of anemias in pregnancy are the result of iron deficiency.[9] In adolescents with deficient hemoglobin or hematocrit levels, the clinical likelihood of iron deficiency can be increased by the presence of any of the following conditions:

- History of iron deficiency anemia
- A short-interval pregnancy (conception within one year of previous delivery)
- History of menorrhagia (heavy menstrual periods)
- Low dietary iron intakes (current or prior to pregnancy)
- Multiple pregnancy
- Borderline hemoglobin during the first trimester
- Clinical signs such as pallor or spoon nails
- Non-compliance with iron supplementation

Responsiveness to iron therapy further indicates iron deficiency. Improvement in hemoglobin level is usually noted within two weeks, and near normal levels achieved by approximately six weeks.[6]

Laboratory

If no improvement in hemoglobin is noted after four weeks of iron therapy (which the adolescent has complied with), further laboratory assessment is indicated (Table 6). Tests which are most useful for diagnosing iron deficiency anemia in pregnancy include:

- Serum ferritin
- Percent saturation of transferrin
- Red cell indices or blood morphology

Table 6
Laboratory Assessment of Anemia in Pregnancy

Test	Value Indicating Anemia
Iron Deficiency:	
Ferritin	< 12 ng/ml
Percent saturation	< 15%
MCV	<80 fl
MCHC	<32%
Folate Deficiency:	
MCV	> 98 fl
MCHC	32-36%
Red cell folate	< 140 ug/ml

Leavell, D.: Mayo Medical Laboratories Interpretive Handbook. Mayo Medical Laboratories, Rochester, MN 1988

- Serum ferritin, an intracellular iron storage protein, indicates iron reserves. A decreased level (<12 ng/ml) is the most sensitive and specific indicator of iron deficiency in pregnancy.
- Although a decrease in serum iron and increase in total iron-binding capacity (TIBC) suggest iron deficiency, the reliability of these tests in pregnancy is influenced by many factors.[4] Transferrin is a protein which binds with and transports iron in plasma. Percent saturation of transferrin, a ratio of serum iron and TIBC, is more sensitive in pregnancy than either test alone. Values <15% are indicative of iron deficiency anemia.[6]
- Mean corpuscular volume (MCV) indicates the average volume of red blood cells. Values <80 femptoliters (fl) are consistent with microcytosis, a characteristic of iron deficiency. Mean corpuscular hemoglobin concentration (MCHC) indicates the concentration of hemoglobin in red blood cells. Values <32% are characteristic of hypochromia associated with iron deficiency.[17] A peripheral blood smear indicating microcytic and hypochromic red cells is consistent with iron deficiency. However, since changes in red cell indices and blood morphology are associated with severe iron deficiency, values may be normal in mild cases. In addition, hemodilution may delay these changes, particularly in mid-pregnancy.[4] Other causes of microcytic, hypochromic anemia include lead toxicity and thalassemia trait.
- A Sickledex, and if positive, a hemoglobin electrophoresis, is indicated in Black adolescents to rule out sickle cell disease. A hemoglobin electrophoresis to rule out hemoglobinopathies may also be appropriate in adolescents who are Asian or of Mediterranean descent. A stool examination for ova and parasites may be indicated in newly arrived Southeast Asian adolescents to rule out parasitic infections.

Management

The goal of therapy is to correct the deficit in circulating hemoglobin mass and replenish iron stores.[4]

- Two hundred milligrams (200 mg) elemental iron will achieve maximal response in hemoglobin synthesis (Table 5).[4] Excessive iron therapy should be avoided since an iron:zinc ratio greater than 3:1 may interfere with zinc absorption and negatively affect zinc status.[18]
  - Use of ferrous sulfate or fumarate, containing a higher percentage of iron, will minimize the number of tablets required and may thus enhance compliance. Liquid or chewable iron preparations may be used if the adolescent is unwilling to swallow tablets.
  - The iron content of prenatal vitamin supplements (usually 60-65 mg elemental) must be considered when determining the therapeutic dosage of iron preparations.
  - Since iron is absorbed primarily from the duodenum and upper jejunum, "controlled-release" or enteric-coated iron preparations may be less effective. They may, however, be of value if the adolescent experiences significant gastrointestinal intolerance or constipation.
- Recommending an increase in dietary fiber and taking iron tablets with food may decrease the likelihood of constipation and nausea and improve compliance.
- Since iron and protein are components of hemoglobin, an increased dietary intake of both may enhance hemoglobin synthesis. Additionally, a substance in meat, fish, and poultry appears to enhance dietary iron absorption. Ascorbic acid also improves iron absorption by reducing it to the ferrous states. For example, absorption of non-meat sources of dietary iron may be nearly tripled by consuming three ounces of meat and one-half cup of orange juice in the same meal.[6] Foods such as iron-fortified cereals, meats, and citrus fruits and juices should be encouraged. Vitamin C supplements are not recommended, since excessive ascorbic acid may be of concern.
- Taking iron preparations with citrus juice may enhance iron absorption, since vitamin C maintains iron in its reduced, more soluble form.[13]
- Caution against taking iron supplements with milk or consuming large quantities of milk or cheese which may inhibit its absorption.[14] Additional substances which may decrease iron absorption include coffee, tea, bran, antacids, and bicarbonate.[6, 13]
- Explain the significance of iron deficiency and the importance of taking prescribed supplements in simple, concrete terms. For example, diagrams of normal and hypochromic, microcytic red blood cells and test tubes filled with red colored water of varying intensities may be used.
- Monitor hemoglobin level every two-to-four weeks and compliance with iron therapy and dietary recommendations at each visit.
- Reduce the dosage of iron when an acceptable hemoglobin level is achieved and maintained.
- Parenteral iron (iron-dextran) may be associated with fever, nausea, chest or joint pain, and pain at the injection site. An anaphylactic reaction to dextran may also occur.[6] Since parenteral iron is not more effective in raising hemoglobin levels than oral iron,[4] its use does not appear to be warranted. An exception may be in adolescents with severe anemia near term who refuse to take oral supplements.
- Approximately 20% of iron deficiency cases may not show a response to therapy because of excess blood volume expansion.[19]

MEGALOBLASTIC ANEMIA

Although less common than iron deficiency, folate deficiency, manifested in severe form as megaloblastic anemia, may occur in adolescent pregnancy as a result of the following conditions:

- **Increased folate demands:** The rapid cellular division associated with blood volume expansion and maternal and fetal tissue growth increases the need for folate, an essential component of DNA synthesis.
- **Insufficient folate intakes:** Low dietary intakes of folate and compromised folate status have been observed in pregnant adolescents.[1, 3] Although many foods contain small amounts of folate, major sources are limited to liver and other organ meats and a few vegetables and fruits. In addition, folate is highly sensitive to heat and oxidation and much of it may be destroyed by cooking and food processing. Body stores of folate last only about three weeks. Short interval pregnancies or hyperemesis may further contribute to folate deficiency.
- **Altered folate absorption or metabolism:** Anticonvulsants (e.g., Phenytoin), as well as chronic or heavy alcohol use, may decrease folate absorption and alter its metabolism. Long-term oral contraceptive use may also negatively affect folate status by impairing dietary folate absorption.[19]

Risks

Folate deficiency may result in impaired DNA synthesis and unbalanced cellular growth. Abnormalities such as neural tube defects, low birth weight, or prematurity may occur. Megaloblastic anemia may be associated with increased risk of:[17,18]

- Postpartum hemorrhage secondary to thrombocytopenia (reduced number of blood platelets).
- Transfusion therapy.

Prevention

- A folate intake of 400-800 ug per day is recommended to prevent folate deficiency and megaloblastic anemia in pregnancy.[12]
  - This is most easily achieved by use of a prenatal vitamin containing 800-1000 ug of folate. A scored prenatal vitamin which can be broken in two may improve compliance in adolescents unwilling to swallow large tablets. A chewable pediatric vitamin containing 400 ug of folate may also be of use.
  - Encourage food sources of folate which may be acceptable to the adolescent, such as oranges, spinach dip, fortified cereals, corn, etc.

Assessment

Persistent anemia, despite compliance with iron therapy, may be caused by folate deficiency, particularly during the last trimester when folate needs are highest.

Clinical

- The presence of any of the following conditions may further suggest folate deficiency:
  - Pregnancy within 12 months of a previous delivery
  - High parity
  - Multiple pregnancy
  - Long-term anticonvulsant therapy, oral contraceptive use, or alcohol abuse
  - Malabsorption syndrome
  - Hyperemesis
  - Non-compliance with folate supplementation
  - Clinical signs of folate deficiency such as a smooth tongue, mouth soreness, or hemorrhaging of the skin or mucous membrane
- Responsiveness to folate therapy further suggests folate deficiency. Three weeks of folate supplementation may be required before improvement in hemoglobin is noted.[4]

Laboratory

Tests most useful for diagnosing folate deficiency anemia in pregnancy include:

- A mean corpuscular volume (MCV) on red cell indices > 98 fl (indicating macrocytosis) and a mean corpuscular hemoglobin concentration (MCHC) of 32-36% (indicating normochromia) are characteristic of folate deficiency anemia.[17]
- A peripheral blood smear indicating normochromia and macrocytic erythrocytes is consistent with megaloblastic anemia.
- A red cell folate, which reflects tissue stores, is the most sensitive, although a late indicator of folate status.[20] Values <140 ug/ml (radioassay) indicate folate deficiency.

Iron and folate deficiency may occur simultaneously, making the diagnosis more difficult. Since iron deficiency usually dominates red blood cell changes and can obscure megaloblastosis, microcytosis or normocytic red blood cells may be evident.[19, 20]

Management

- Eight hundred micrograms (800 ug) per day of folate, continued for two months post-delivery,[4] will correct folate deficiency and replete tissue stores. This may be achieved through use of a prenatal vitamin supplement containing 800-1000 ug folate or, if necessary, 1 mg folate tablets.
- Encourage the adolescent to choose foods which supply folate.

HYPERTENSIVE DISORDERS

Hypertensive disorders are a major source of perinatal mortality and morbidity in adolescent pregnancy. These disorders, which include a progressive disease associated with pregnancy, pre-existing hypertension, as well as a combination of these, are classified in Table 7.[1, 2]

- Pregnancy-induced hypertension (PIH), the most common of the hypertensive disorders, is an elevation of blood pressure, usually occuring after 20 weeks gestation. It is a disease process which may develop into preeclampsia; and finally, eclampsia. Hypertension alone can account for increased pregnancy loss at all stages of gestation.
- Preeclampsia, previously referred to as "toxemia," is characterized by hypertension, proteinuria, and/or edema after 20 weeks gestation. It is most common in young primiparas. Additional risk factors include multiple gestation, diabetes mellitus, or chronic renal disease.[3-5]

Table 7
Classification of Hypertensive Disorders in Pregnancy

1. Pregnancy-induced hypertension
   a. Preeclampsia
   b. Eclampsia
2. Chronic hypertension preceding pregnancy
3. Chronic hypertension with superimposed pregnancy-induced hypertension
   a. Preeclampsia
   b. Eclampsia
4. Late or transient hypertension

Table 8
Risks Associated with Hypertensive Disorders of Pregnancy

- Abruptio placentae
- Spontaneous abortion (1st and 2nd trimester)
- Intrauterine growth retardation
- Fetal death in utero
- Prematurity
- Maternal: cerebral hemorrhage; renal, hepatic, or cardiac failure; disseminated intravascular coagulation; generalized bleeding

- Preeclampsia can rapidly progress to eclampsia, a rare, life-threatening condition characterized by seizures. Marked hypertension and/or coagulation abnormalities may also be present.[6,7]
- Chronic hypertension, diagnosed more frequently in young people, may complicate adolescent pregnancy.[8] All chronic hypertensives are at risk for developing superimposed PIH characterized by rapid onset, significant proteinuria, and generalized edema. This condition is particularly hazardous because of its severity and earlier onset (prior to 20 weeks).[4]
- Late hypertension involves transient elevations in blood pressure during labor or the early postpartum period.

RISKS

All hypertensive disorders, regardless of the type, pose a significant threat to the adolescent and her infant. Perinatal mortality rates may be 15-20% higher, and neonatal morbidity may be increased as much as 50%. Pregnancy risks associated with hypertensive disorders are summarized in Table 8.[3,4,7,8]

ETIOLOGY

The etiology of PIH is unknown despite several theories involving genetic, hormonal, immunologic, and nutrition factors. Excesses of energy or sodium, as well as deficiencies of protein, vitamin B_6, vitamin C, calcium, or zinc have been implicated. However, there is little evidence to support their role in the origins of this disease. It is clearly recognized that neither obesity, excessive weight gain, nor excess dietary sodium are predisposing factors for the development of PIH.

PREVENTION

There is no known way to prevent pregnancy-induced hypertension, although misguided attempts have frequently focused on the manipulation of sodium and water retention.

- The retention of 800-900 mEq of sodium and six to eight liters of water is a normal physiological adjustment of pregnancy to accommodate:[7]
  - Maternal and fetal tissue gain
  - Expanded maternal blood volume
  - Increased renal and cardiac circulation
- At the time sodium needs are increased, a 50% increase in the glomerular filtration rate, and a 10- to 100-fold increase in progesterone promote sodium loss. Sodium balance is maintained by the sodium conserving mechanism, the Renin-Angiotensin-Aldosterone system (RAA).[9]
- Edema, including that of the face and hands, occurs in 80-90% of normotensive women.
  - Rather than being pathological, edema has been associated with higher birth weights.[10]
  - Edema appears to be related to lowered plasma oncotic pressure resulting from hemodilution and hypoalbuminemia. Obstruction of the pelvic veins by the enlarged uterus limits venous return from the lower extremities, further contributing to the edema. Bed rest on the left side reduces uterine pressure on the inferior vena cava and helps to alleviate edema.
- Attempts to interfere with normal sodium and water retention in pregnancy will not prevent PIH. Instead, sodium restriction or the use of diuretics may:[7-9,11]
  - Predispose to hypertension in later pregnancy
  - Deplete fluid and electrolytes
  - Limit normal plasma volume expansion
  - Decrease placental perfusion
  - Overstimulate and stress the RAA

PATHOPHYSIOLOGY

Pregnancy-induced hypertension is characterized by an inadequate expansion of plasma volume and an increase in vascular tone. The sequel of these events and their causes, however, are unclear.

- Plasma volume may be 30-50% of normal. A similar reduction in placental blood flow[1,2] compromises oxygen and nutrient transfer and, subsequently, fetal growth and well-being. The greatest reduction in plasma volume and placental perfusion occurs in PIH superimposed on chronic hypertension.[7]
- Increased sensitivity to vasoactive agents results in intense vasospasms of peripheral arterioles and hypertension. With acute vasospasms, ischemia, and lesions of target organs may occur (renal, hepatic, cerebral, cardiac, uteroplacental).[4,11]

ASSESSMENT

Early diagnosis and aggressive management of hypertensive disorders are essential for a successful pregnancy outcome.[4] Blood pressure levels normally decrease 15-20 mmHg during the first 16-20 weeks of pregnancy, reflecting decreased peripheral vascular resistance resulting from increased cardiac output. An increase in blood pressure to pre-pregnancy levels occurs during the third trimester, coinciding with blood volume expansion and increased peripheral vascular resistance.[5,7,8]

Pregnancy-Induced Hypertension

The criteria established by the American College of Obstetricians and Gynecologists for the diagnosis of PIH are:[1]

- Increase in systolic blood pressure ≥30 mmHg
- Increase in diastolic blood pressure ≥15 mmHg
- Systolic blood pressure ≥140 mmHg
- Diastolic blood pressure ≥90 mmHg
  - Any of these criteria must be met on two or more occasions, at least six hours apart, in previously normotensive adolescents.
  - Since adolescents tend to have lower pre-pregnancy blood pressures than adults, the first two criteria (above) are most indicative of hypertension in this population.
  - Additional evidence related to fetal morbidity suggests that diastolic blood pressures above 75 mmHg during the second trimester and above 85 during the third trimester may also be of concern.[5]

Preeclampsia

Preeclampsia is characterized by:[1, 4, 6]

- Hypertension (see above)
- Proteinuria ≥300 mg/24 hours (corresponding to 2+ on random dipstick)
- Marked generalized edema (>1+ pitting) in the morning; rapid weight gain (≥5 lb/one week)

Elevated serum uric acid levels and a decreased creatinine clearance may also be indicative of preeclampsia.

Severe preeclampsia may be associated with headaches, blurred vision, abnormal reflexes, epigastric pain, oliguria (<400 ml/24 hours), or congestive heart failure. These conditions reflect central nervous system, retinal, hepatic, renal, and cardiac involvement. Pulmonary edema or cyanosis may also be present.[4,7]

Severe preeclampsia is associated with blood pressure readings ≥160 mmHg systolic or ≥110 mmHg diastolic on two occasions, and proteinuria ≥ 5 g/24 hours (3+ to 4+ on urine dipstick).

Eclampsia

Eclampsia is characterized by grand mal seizures up to 48 hours after delivery.[4]

Chronic Hypetension

Pre-existing hypertension is characterized by hypertension of any etiology prior to pregnancy, before 20 weeks gestation, or beyond six weeks postpartum.[7]

- Blood pressure levels ≥140/90 mmHg;[8] or
- Diastolic blood pressure >75 mmHg during the second trimester

MANAGEMENT

Hypertensive disorders are managed primarily with bed rest, which improves maternal and fetal well-being by promoting:[8,9]

- Vasodilation and a decrease in blood pressure
- Reduced vasoconstriction, resulting in increased plasma volume, renal blood flow, and improved perfusion of vital organs and the placenta
- Decreased excretion of epinephrine and norepinephrine, which decreases cardiovascular reactivity
- Diuresis secondary to intravascular volume repletion

Protein lost through significant proteinuria is replaced with an increase in dietary protein of 0.5 g/kg/day.[8]

Diuretics and sodium restriction are contraindicated in the management of hypertensive disorders of pregnancy. They are not only ineffective, but potentially hazardous.[1,4,8,9,12-14]

- Edema is thought to result from a pathological redistribution of extracellular fluid. Despite marked fluid retention, plasma volume is depleted and placental perfusion compromised.
- Renal sodium loss may be increased in preeclampsia, while many women with chronic hypertension are sodium wasters.[13]
- Potential risks of sodium restriction include:[5, 8-10, 14]
  - Excessive renal sodium loss
  - Severe sodium, potassium, and fluid depletion
  - Further depletion of plasma volume, cardiac output, and placental perfusion
  - Reduced glomerular filtration rate, renal plasma blood flow, and potential renal failure
  - Possible intrapartal hypotension and vascular collapse
  - Exhaustion of the RAA system
- Increased sodium intakes may improve hemodynamic abnormalities by increasing plasma volume and decreasing stress on the RAA system.[12]

- Mild sodium restriction may be indicated in rare cases (<1%) of volume-dependent hypertensives (e.g., those with chronic renal disease). Most adolescents with well-controlled hypertension will not need a sodium restriction during pregnancy because of increased sodium requirements.[8]

COUNSELING

Encourage the adolescent with a hypertensive disorder to:

- Consume a nutritionally balanced diet
- Avoid sodium restriction and salt food to taste, using iodized salt
- Drink fluids liberally
- Comply with bed rest recommendations

DIABETES

Gestational diabetes (pregnancy-related or diagnosed), as well as Type I or Type II diabetes (pre-existing), may complicate adolescent pregnancy.

GESTATIONAL

Gestational diabetes mellitus (GDM) occurs in up to 5% of all pregnancies.[1] This condition, as defined by the National Diabetes Data Group, involves:[2]

- Carbohydrate intolerance of variable severity
- Possible need for insulin therapy
- Onset or first recognition during current pregnancy (carbohydrate intolerance may have occurred prior to pregnancy or persist after delivery)

Risks

Gestational diabetes is a major cause of perinatal mortality and morbidity. The severity of risk associated with this condition (Table 9) appears to be determined by the degree of maternal hyperglycemia. Even mild blood sugar elevations, however, may cause fetal macrosomia (excessive size).[3] Infants of mothers with elevated fasting and post-prandial blood sugar levels are at greatest risk for intrauterine death or neonatal morbidity.[2,4,5]

Pathophysiology

- Normal pregnancy is associated with increased insulin resistance and reduced carbohydrate tolerance during the second and third trimesters. These changes appear to be related to:[2,3]
  - Increased production of insulin-antagonistic hormones: human placental lactogen, glucagon, estrogen, progesterone, cortisol.
  - Decreased insulin receptor binding to target cells combined with relative lack of circulating insulin.
- In some individuals, the diabetogenic effect of pregnancy may stress pancreatic reserves and precipitate carbohydrate intolerance not previously manifested.
- While maternal glucose readily crosses the placenta, insulin does not. Elevated maternal blood glucose levels produce fetal hyperglycemia which, in turn, results in hyperinsulinemia, lipogenesis, glycogen and protein synthesis, and subsequent macrosomia.

Table 9
Risks Associated with Gestational Diabetes

Perinatal
Preeclampsia
Polyhydramnios
Caesarian delivery
Prematurity
Macrosomia; birth trauma, shoulder dystocia
Neonatal metabolic abnormalities
Hypoglycemia
Hypocalcemia
Hyperbilirubinemia
Polycythemia
Respiratory distress syndrome
Infancy/Childhood
Possible impaired carbohydrate tolerance or obesity in later life

Prevention

There is no known way to prevent gestational diabetes. It appears appropriate, however, to avoid excessive weight gain, since the insulin resistance associated with excess adipose tissue may further stress carbohydrate tolerance.

Assessment

Early recognition and aggressive management of gestational diabetes are essential for successful pregnancy outcome.

- Screen all pregnant adolescents between 26-28 weeks gestation, using a 50 g glucose challenge (Table 10).[4]
  - Adolescents at high risk for GDM should be screened earlier in pregnancy (e.g., 12 weeks) and, if normal results are obtained, again at 26-28 weeks gestation. Risk factors include:
    * Strong family history of diabetes
    * Significant obesity
    * History of delivering an excessive sized infant (>4000g)
    * Unexplained pregnancy loss
    * History of GDM

Table 10
Glucose Screen

- Preparation: NONE (time of day or food intake prior to test are not regarded)
- 50 g oral glucose load in at least 200 ml water
- Foods and beverages other than water, as well as cigarette smoking, are avoided during the test
- Venous plasma glucose determination one hour after began drinking glucose solution
- Abnormal glucose screen = venous plasma blood glucose ≥ 140 mg/dl

    * Polyhydramnios
    * Current fetal weight estimated to be large for gestational age (LGA)
    * Persistent glycosuria
  - A second glucose screen may be indicated at approximately 32 weeks gestation when GDM is suspected, despite a normal screen at 26-28 weeks (e.g., polyhydramnios, estimated fetal weight, LGA). Approximately 20% of those with a negative glucose screen earlier in pregnancy may have a positive test at 32 weeks.[5]
  - Capillary blood (finger stick) glucose analysis using a reflectance meter or glucose oxidase-impregnated sticks are not accurate enough for the diagnosis of GDM.
  - A glycohemoglobin determination is not sensitive enough for diagnosing GDM.
- An Oral Glucose Tolerance Test (OGTT) is indicated for all adolescents with an abnormal glucose screen result (>140 mg/dl)[2] (Table 11).

  Gestational diabetes is classified in Table 12.[6]

Management

The goal of management of the gestational diabetic is to maintain maternal blood glucose levels within normal ranges while promoting optimal nutrient intake and weight gain.

- In pregnancies not complicated by diabetes, venous glucose levels usually range from 60-80 mg/dl in the fasting state to 120 mg/dl after meals.[7]
- Goals for plasma glucose levels are:
  - Fasting: 60-90 mg/dl
  - Two-hour post-prandial: 120-140 mg/dl

  Values <60 mg/dl should be avoided, since hypoglycemia may also be detrimental to the fetus.
- Nutrition management is the primary therapy for maintaining blood glucose levels and alone is effective in approximately 85% of gestational diabetes cases.[8] Goals include:
  - Minimal sucrose intake
  - Avoidance of excessive weight gain
  - Increased fiber intake
  - Decreased fat intake
  - Regular, balanced intake of healthy foods (three meals and two to three snacks)
  - Moderate physical activity, particularly after meals

Table 12
Classification of Gestational Diabetes

Class	Fasting Plasma Glucose		Postprandial Blood Glucose	Therapy
A-1	< 105 mg/dl	and	< 120 mg/dl	Diet
A-2	> 105 mg/dl	and	> 120 mg/dl	Insulin

Table 11
Glucose Tolerance Test (3 Hour)

- Preparation: ≥ 150 g carbohydrate intake daily for three days prior to test and unrestricted activity (to avoid false positive results)
- Overnight fast of eight-fourteen hours
- Morning fasting venous plasma glucose determination
- Food and beverages other than water and cigarette smoking are avoided during the test
- Activity is restricted during the test
- 100 g glucose load in at least 400 ml water
- Venous plasma glucose determination at one, two, and three hours after began drinking glucose solution
- Abnormal OGTT = two or more of the following venous plasma glucose values:[2]

  Fasting: ≥ 105 mg/dl
  One hour: ≥ 190 mg/dl
  Two hour: ≥ 165 mg/dl
  Three hour: ≥ 145 mg/dl

- When dietary modifications alone are unsuccessful (fasting venous plasma glucose >105 mg/dl or two-hour post-prandial venous plasma glucose >120-140 mg/dl) on two or more occasions within one-to-two weeks, insulin therapy is indicated (oral agents are contraindicated in pregnancy).
- The expertise of a nutritionist/registered dietitian is needed when insulin is required. Nutrition management, in addition to that of non-insulin managed GDM, includes:
  - Coordination of insulin therapy with regular eating pattern (20-30 minutes prior to meal).
  - Assurance of an evening snack and breakfast to prevent morning hypoglycemia.
  - An energy intake of approximately 40 kcal/kg of pregnant body weight for adolescents of normal pre-pregnant weight and 25-30 kcal/kg if ≥120% of standard weight/height prior to pregnancy (up to 3000 kcal/day).
  - An energy distribution of approximately 50% of kcal as carbohydrate, 30% of kcal as fat, and 20% of kcal as protein.
  - Distribution of carbohydrate throughout the day; approximately 25% in the morning, 25% at midday, 5% in the afternoon, 30% in the evening, and 15% at bedtime.[9]

Alternative Sweeteners

Sorbitol, Mannitol, Xylitol

These sugar alcohols are absorbed more slowly from the gastrointestinal tract and thus have less influence on blood glucose or insulin levels. They supply 4 kcal/g which must be considered in total energy intake.

In addition to being more expensive, the slow, passive absorption of sugar alcohols produces osmotic diarrhea, malabsorption, and abdominal discomfort. Symptoms may occur in some individuals at levels as low as 10 grams.[10]

Saccharin

Saccharin may be a weak carcinogen and is not recommended for use in pregnancy.[11]

Aspartame

- Equal sugar substitute or Nutrasweet (Searle) in processed foods is approximately 200 times sweeter than sucrose. It is useful in uncooked foods, but is unstable when heated.
- Aspartame is composed of the amino acids, L-phenylalanine and L-aspartic acid. When metabolized, aspartame yields aspartic acid, methanol, and phenylalanine.
- Abuse doses of aspartame in normal and PKU carrier subjects (equivalent to 50 and 25 12-ounce cans, respectively, of a carbonated beverage 100% sweetened with aspartame) have resulted in blood levels of these metabolites well below those of concern.[11]
- Aspartame is considered safe for use in pregnancy.[10-12]
- Although the FDA has established the acceptable daily intake of aspartame at 50 mg/kg (equal to 12-14 12-ounce cans of carbonated beverage 100% sweetened with aspartame in a 60 kg person), moderation in intake (e.g., up to three servings per day of products containing aspartame) appears appropriate.

Monitoring

Frequent monitoring of blood glucose control is an essential component of care.

- Schedule frequent prenatal visits with the adolescent (e.g., every two weeks, and weekly during the last month of pregnancy)
  - Determine venous plasma glucose level after fasting and two hours after breakfast.
  - Determine presence of urinary ketones.
- Provide a home glucose monitoring system (reflectance meter or glucose-oxidase impregnated sticks) for adolescents requiring insulin therapy.
  - Instruct the adolescent to monitor blood glucose level four times per day (fasting and prior to meals or two hours after meals).
  - The correlation of capillary blood (finger stick) glucose values with venous plasma glucose values is sufficient for use of the same standards when monitoring diabetes control.
  - Request that the adolescent keep a record of blood glucose levels and bring it to clinic visits.
- Urine glucose values are not useful in assessing diabetic control in pregnancy. The increased glomerular filtration rate may result in glycosuria despite normal blood glucose levels in approximately 50% of normal pregnancies.[13]
- Periodic glycohemoglobin determinations are useful in monitoring long-term glucose control.
  - The attachment of glucose to hemoglobin (glycosylation) occurs continuously during the 120-day lifespan of red blood cells in relation to the concentration of plasma glucose. The degree and duration of plasma glucose elevations are thus reflected.
  - In normal pregnancy, glycohemoglobin accounts for 5-7% of hemoglobin. Levels > 7% indicate suboptimal control.[14]

Counseling

The adolescent with GDM requires frequent counseling and support.

- Use a health care team approach.
- Discuss in simple, concrete terms the implications of GDM for the adolescent and her infant, and the importance of a good blood glucose control.
- Avoid the term "diet." Instead, use "eating plan" or "meal plan."
- Suggest realistic dietary changes, considering the adolescent's present food habits, as well as family, cultural, and peer influences, and economic limitations.
- Involve the adolescent in her care as much as possible.
- Involve the adolescent's partner and family.
- Teach the adolescent to read food labels.
- Use concrete educational approaches such as test tubes filled with sugar to depict the amount of sugar in various foods.

Follow-Up

Approximately six weeks after delivery, reassess the venous plasma glucose level using a two-hour oral glucose tolerance test and 75 grams of glucose (follow same guidelines for three-hour OGTT).

- Diabetes mellitus: Fasting venous plasma glucose ≥140 mg/dl, or two-hour and at least one other value (1/2 hour, 1 hour, 1-1/2 hour) ≥200 mg/dl.
- Impaired glucose tolerance (OGTT values between normal and diabetic): Fasting venous plasma glucose <140 mg/dl; two-hour value, 140-200 mg/dl; and 1/2 hour or one-hour, ≥200 mg/dl.[2]

Since more than one-half of those with GDM may develop diabetes mellitus in later life,[2] encourage the adolescent with a normal two-hour OGTT to:

- Reach and/or maintain a normal weight.
- Exercise regularly.
- Have her blood glucose level or, at minimum, a urine glucose determination checked yearly.

TYPE I DIABETES

Pregnancies complicated by pre-existing diabetes are characterized by:

- Insulin dependency
- Proneness to ketoacidosis
- Increased risk of congenital anomalies
- Increased risk of intrauterine growth retardation
- Increased risk of intrauterine death

Management

Care of the adolescent with Type I diabetes is similar to that of the gestational diabetic, with emphasis on strict blood glucose control.

VEGETARIANISM

Religious or philosophical beliefs, as well as economic or health concerns, may motivate some adolescents to choose a vegetarian approach to eating. Avoidance of animal foods can be compatible with good health.[1] The higher fiber and complex carbohydrate and lower fat and energy content characteristic of vegetarian eating patterns may also have health benefits.[2] The potential advantages of vegetarianism during pregnancy may include:[2]

- Improved carbohydrate tolerance
- A decreased incidence of constipation
- Less likelihood of excessive weight gain

Vegetarian eating patterns, particularly when highly restrictive, require careful planning and supplementation to meet the needs of the pregnant adolescent and her developing fetus. Popular forms of vegetarianism, foods typically excluded, and nutrients which can be lacking with each are listed in Table 13.

RISKS

Poorly planned or unsupplemented vegetarian eating patterns can result in nutrition problems during pregnancy (Table 14).[2,3] The adolescent may be especially at risk if she is young, has a closely spaced pregnancy, or has avoided animal foods for several years.

Compromised iron status may result from:[4]

Table 13
Vegetarian Eating Plans:
Foods Excluded and Nutrients Potentially Lacking

Type	Foods Excluded	Nutrients Potentially Lacking
Partial	Red meat	Iron
Lacto-ovo	Meat, fish, poultry	Energy, iron, iodine
Lacto	Meat, fish, poultry, eggs	Energy, iron, iodine
Total (vegan)	Meat, fish, poultry, eggs, dairy products	Energy, protein, calcium, iron, zinc, vitamin B_{12}, vitamin D, riboflavin, iodine

Table 14
Potential Risks of Vegetarian Eating Patterns During Pregnancy

Iron deficiency anemia
Low pre-pregnancy weight
Low gestational weight gain
Compromised protein utilization
Decreased mineral absorption
Nutrient imbalances or deficiencies

- Depleted iron stores
- Low dietary iron intakes
- Less effective absorption of non-heme iron from plant sources
- Inhibitory effect on iron absorption by:
  - Fiber
  - Phytates (from whole grain)
  - Tannins (from tea)
  - Soy products
  - High calcium intakes (which may occur with lacto-vegetarianism)

Low energy intakes prior to pregnancy may be associated with:[2]

- Delayed onset of menarche
- Younger gynecological age
- Low pre-pregnancy weight

Insufficient energy intakes during pregnancy may result in:

- Inadequate weight gain
- Utilization of protein for energy rather than tissue synthesis

Zinc bioavailability may be impaired by:[4]

- Oxalates (contained in some vegetables)
- Fiber
- Soy products
- Calcium
- Iron supplements
- Phytates (from whole grains). An exception is yeast leavened whole grain bread, since the fermentation process releases zinc from phytates.[3]

The lack of vitamin B_{12} in total vegetarian eating patterns may result in:[5,6]

- Megaloblastic anemia
- Degeneration of the spinal cord
- Compromised DNA synthesis
- Decreased fetal stores of vitamin B_{12}

Typically high folate intakes may mask the hematological changes associated with vitamin B_{12} deficiency, while neurological damage progresses.

ASSESSMENT

Obtaining the information in Table 15 will help to identify possible nutrition concerns and provide a basis for nutrition management, education, and counseling.

MANAGEMENT

Protein Quality And Quantity

Milk and eggs provide high quality protein (all of the eight essential amino acids in balanced amounts). Plant sources of protein, which lack one or more of the essential amino acids, can provide adequate amounts of high quality protein when combined (see Table 16).

- Mixtures of grains, legumes, vegetables, seeds, and nuts consumed throughout the day can meet protein needs.
- It is not necessary that precise combinations of plant proteins be eaten at the same meal, since endogenous amino acids can be used to complete the amino acid profile.[7]

Meat analogs (textured plant proteins usually derived from wheat, soybeans, peanuts, and yeast) can also be used to obtain high quality protein. These products simulate the texture, flavor, and known nutrient content of meat, poultry, and fish.

An energy intake of at least 36 kcal/kg will assure efficient protein utilization.[8]

Table 15
Assessment of the Pregnant Adolescent with Vegetarian Food Practices

Type of vegetarian food plan
Foods eaten and excluded
Length of time vegetarian plan followed
Reason for choosing vegetariansim
Use of fortified products (e.g., meat analogs)
Use of vitamin/mineral supplements
Use of organic/natural foods
Use of herbs/"health foods"
Knowledge of nutrition
Practices such as fasting
Willingness to take prescribed supplements
Eating pattern planned during pregnancy

Table 16
Plant Protein Combinations

Protein Combinations	Examples	Protein (g)
Legumes & Grains		
Legumes (soybeans, lentils, black-eyed peas, split peas, garbanzo beans, soybeans dried beans, peanuts)	1 cup baked beans + 2 slices brown bread	12
	1 cup cooked red beans + 1 cup cooked rice	19
	1 cup split pea soup + 2 slices rye bread	7
Grains (wheat, corn, rice, oats, barley, rye)	1 cup chili + 2 pieces cornbread	30
	2 corn tortillas + 1/2 cup cooked rice + 1/2 cup cooked pinto beans	15
Grains & Milk Products	1 cup cereal + 1 cup milk	12
	2 slices cheese pizza	10
	1 cup macaroni and cheese	17
	1 grilled cheese sandwich	15
Legumes & Seeds (pumpkin, sunflower, sesame)	1 ounce shelled sunflower seeds + 1 ounce peanuts	17

Source: Pennington, J., Church, H.: Food values of portions commonly used. Harper & Row, New York, 1985.

Table 17
Food Sources of Vitamins and Minerals for Vegetarians

Nutrient	Food Sources
Calcium	Fortified soybean milk, dark green vegetables (spinach, broccoli, collards, kale, mustard and turnip greens)
Iodine	Iodized salt
Iron	Fortified breakfast cereals, whole or enriched grain products, legumes, seeds, dried fruit, spinach
Riboflavin	Legumes, whole grains, dark green vegetables, wheat germ
Vitamin B_{12}	Fortified breakfast cereals, meat analogs, fortified soybean milk

Weight Management

Small frequent meals and snacks which include energy dense nutritious foods are recommended to assure adequate weight gain. These may include: nuts, peanut butter, sunflower seeds, pumpkin seeds, dried fruits, avocado, fruit nectars, etc.

Weight gain should be monitored closely and charted on weight gain grid.

Vitamin And Mineral Adequacy

Table 17 lists foods which can increase the intake of vitamins and minerals frequently lacking in vegetarian eating plans.

VITAMIN AND MINERAL SUPPLEMENTATION

To assure adequate intake, supplementation of some nutrients is recommended for pregnant adolescents following vegetarian food plans[2,7] (Table 18).

COUNSELING

Some vegetarians may be willing to liberalize their eating patterns during pregnancy. Adolescents who choose to continue total vegetarian plans will require in-depth counseling by a nutritionist/registered dietitian.

General guidelines for counseling pregnant adolescent with vegetarian eating patterns:

- Use a non-judgmental, accepting approach[9]
- Reinforce positive aspects of current eating patterns[9]
- Prioritize nutrition concerns[9]
- Encourage the adolescent to:
  - Follow the daily food guide (Tables 19a, 19b)
  - Include dairy products and/or eggs in eating pattern
  - Eat a variety of foods
  - Consume frequent, small meals/snacks of nutrient-dense foods
  - Limit foods of high sugar or fat content

Table 18
Vitamin/Mineral Supplementation

Supplement	Dosage	Vegetarian Plan
Iron	30-60 mg (elemental)	All
Calcium	1200 mg	Vegan
Vitamin D	400 IU	Vegan
Vitamin B_{12}	4 ug	Vegan
Zinc	20 mg	Vegan

1. Supplementation of these nutrients can be most easily achieved by use of a prenatal vitamin and an additional calcium supplement.
2. Supplements which do not contain artificial colors may be most acceptable to adolescents interested in "natural" products.
3. Over-supplementation should be avoided to prevent nutrient toxicity or imbalances.
4. Most soybean milks are not fortified with calcium. Plant sources contain significantly less calcium than milk.
5. The synthesis of adequate amounts of vitamin D from the action of ultraviolet light on the vitamin's precursor in skin cannot be relied upon, particularly in northern climates[3] or in dark-skinned individuals.
6. Not all soybean milk is fortified with vitamin B_{12}. Nutritional yeast or brewer's yeast do not contain active vitamin B_{12}[5]. Seaweed, kelp or fermented soy products such as tempeh or miso are also unreliable sources of vitamin B_{12}[3,5,7].

- Use a vitamin C source with meals to enhance dietary iron absorption
- Use iodized salt in cooking and on foods
- Comply with prescribed vitamin/mineral supplementation
- Avoid self-prescribed supplements
- Avoid toxic herbs or herbal teas (e.g., lobelia, comfrey)
- Avoid unsafe practices such as fasting
- Gain an appropriate amount of weight

Table 19(a)
Vegetarian Food Guide for Pregnant Adolescents

Food Group	Lacto-ovo	Vegan
Dairy Products/Fortified Soymilk	5	5
Meat Alternatives	3	3/5*
Fruits/Vegetables		
Vitamin C source	2	2
Dark green leafy	1	3
Other	2	3
Whole Grain Products	6	6/8*
Fats/Oils	2	2

*When soy milk not used

Modified from Marino, D., King. J. Nutritional Concerns during Adolescence. *Ped. Clin. North Amer.* 27:125-139, 1980.

Table 19(b)
Food Groups and Serving Sizes

Dairy Products		Meat Alternatives		Vegetables/Fruits		Grain Products		Fats/Oils
Milk	1 c	Egg	2	Juice	1/2 c	Bread	1 sl	2 tbsp
Kefir	1 c	Cheese	2 oz	Cooked/canned	1/2 c	Cereal (cold)	1 c	
Yogurt	1 c	Cottage/Ricotta cheese	1/2 c	Raw	1 c or	(cooked)	1/2 c	
Cheese	1.5 oz	Meat analog	3 oz		1 med piece	Pasta	1/2 c	
Cottage Cheese	1 c	Tofu	7 oz			Rice	1/2 c	
Ricotta Cheese	3/4 c	Dried peas/beans/	1 c			Wheat germ	1/2 c	
Soup (made with milk)	1 c	soybeans (cooked)				Wheat berries	1/3 c	
Pudding	1 c	Peanut butter	4 Tbsp			Bulgar	1/4 c	
Fortified soymilk	1 c	Nuts	3 oz					
Ice cream	2 c							
Ice milk, soft serve	1 1/4 c							
Pudding	1 c							
Tofu	8 oz							

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Resources

American Diabetes Association
Two Park Avenue
New York, NY 10016
(212) 683-7444

American Dietetic Association
430 North Michigan Avenue
Chicago, IL 60011
(312) 280-5000

International Diabetes Center
5000 West 39th Street
St. Louis Park, MN 55416
(612) 927-3393

10

DISCOMFORTS OF PREGNANCY

Elizabeth J. Gong, M.P.H., M.S., R.D.

Certain gastrointestinal discomforts often occur during pregnancy. The most common complaints include nausea and vomiting, constipation and heartburn.[1,2] Other discomforts with possible nutritional implications include ptyalism and leg cramps. These discomforts may interfere with the adolescent's ability to meet her nutritional needs.

Fortunately, in most instances, symptoms tend to be mild. Dietary and other changes in behavior may help alleviate some of these discomforts during pregnancy. Any type of medication, including over-the-counter drugs, should not be taken without consultation and supervision of a health professional.[3]

NAUSEA AND VOMITING

Nausea and vomiting are common complaints, especially during early pregnancy. Over half of all pregnant women experience some nausea and vomiting,[1,4,5] with the severity of the problem varying among individuals.

Etiology

The exact cause of nausea during pregnancy is unknown, but it has been attributed to physiological causes and psychological causes. The majority of the cases of nausea and vomiting are caused by physiological factors.[6]

1. Hormonal
   a. High levels of circulating progesterone
      Progesterone causes generalized relaxation of smooth muscles of the body, including those of the gastrointestinal tract. Reduced motility of the gastrointestinal tract has been implicated as a cause of nausea and vomiting during pregnancy.[7]
   b. High levels of circulating estrogen
      High levels of estrogen have a direct effect on the emetic center and chemoreceptor trigger zone.[8] The emetic center in the brain stem activates the vomiting process. The chemoreceptor trigger zone (on the surface of the medulla) also exerts vomiting action, however it does so by sending stimuli to the emetic center.[4]
   c. High levels of human chorionic gonadotropin (HCG)
      Serum HCG levels are maximal during the first trimester of pregnancy. In twin pregnancies and patients having hydatidiform moles, both groups showed higher HCG levels and suffered more severe nausea/vomiting.[9] However, more recent, detailed research has failed to demonstrate a correlation between the presence or severity of nausea and vomiting during pregnancy and serum HCG levels.[10]
2. Orthostatic hypotension
   a. Nausea and vomiting often occur when the pregnant woman first wakes up (and hence the commonly used term "morning sickness") and gets out of bed, leading some association between orthostatic hypotension and nausea and vomiting.[11]
   b. A recent study revealed that the most common and helpful practice used by pregnant teenagers to help control their nausea and vomiting was to lie down.[12] Lying down may counteract orthostatic hypotension and relieve some of the symptoms.
3. Poor vitamin B_6 status

   Vitamin B_6 (as pyridoxine) has been included in the treatment of the symptoms of nausea and vomiting during pregnancy. However, a recent study found no relationship between vitamin B_6 status and the degree of morning sickness in pregnancy. If vitamin B_6 does alleviate nausea and vomiting during pregnancy, it's efficacy is not likely related to inadequate vitamin B_6 status of the pregnant woman.[13]
4. Gastric Hyposecretion

   Reduced secretory activity of the stomach may contribute to the nausea at this time.[1,7,8]
5. Psychological causes

   A few cases of nausea and vomiting may be related to psychological reasons. Anxieties concerning the pregnancy, problems with acceptance of the pregnancy, feelings of ambivalence, denial and rejection,

and unresolved conflict have been suggested to contribute to the nausea and vomiting.[4,14,15] Nausea and severe vomiting during pregnancy have been associated with more mental symptoms.[14]

Complications

Hyperemesis gravidarum occurs when vomiting becomes more severe, prolonged and persistent — and leads to weight loss, dehydration and electrolyte imbalance. Ketones may be present in the urine; the smell of acetone may be detected in the breath. This condition may require hospitalization, especially if rehydration by mouth is not tolerated well.[1,4,8,11] Hospitalization is recommended when severe vomiting, electrolyte imbalance, large urine ketones (+4) and weight loss of the more than five percent of total weight are present.[16] Hyperemesis gravidarum is often associated with psychological problems. Fortunately the incidence of this severe form of vomiting has decreased in recent years.[1,4]

Management

Since the exact cause of nausea and vomiting during pregnancy is not known, it is difficult to make definite recommendations. Table 1 summarizes the recommendations for the management of nausea and vomiting.

Table 1
Recommendations for the Management of Nausea and Vomiting during Pregnancy

1. Lie down during an episode of nausea. Sitting quietly may help. Move slowly, without sudden movements.
2. Try dry crackers, dry toast or dry cereal before rising.
3. Eat small, frequent high-carbohydrate meals throughoutthe day, rather than large, infrequent meals. Avoid long periods without eating. An empty stomach may aggravate the nausea.
4. Get plenty of fresh air. Going outside may help. Good air circulation may be especially important when cooking.
5. Separate the intake of solids and liquids by 1/2 to 1 hour.
6. Drinking small amounts of lightly-flavored drinks (juice and carbonated beverages) may be helpful.
7. Greasy, fried, and high-fat foods may be poorly tolerated. These include french fries, hamburgers, fried chicken and many other fast foods, chips, luncheon meats, bacon, margarine, butter, salad dressing, mayonnaise, ice cream, donuts and many other pastries and baked desserts.
8. Highly seasoned and spicy foods may be problematic. Coffee may also aggravate the situation.
9. Provide supportive counseling to promote nutritious foods; reinforce that nausea and vomiting usually subsides after the third month of pregnancy.
10. Encourage regular activity and exercise, when possible.

CONSTIPATION

Many women develop constipation during pregnancy, particularly during the last trimester. Fortunately it is usually a minor problem.

Etiology

Factors which may contribute to constipation during pregnancy include:

1. Reduced smooth muscle tone and decreased gastrointestinal motility due to increased levels of progesterone.[1,2,18]
2. Increased pressure on the lower bowel due to the enlarged uterus.[1-3,18]
3. Decreased physical activity.[7]
4. Dietary changes may decrease the intake of fiber[2,19] or cause an increase in the intake of bland foods.[18]
5. Ingestion of ferrous sulfate supplements may contribute to constipation.[7,18]

Complications

Possible complications of constipation include intestinal obstruction or impaction. A tendency toward constipation in pregnancy may also contribute to hemorrhoids.[18]

Management

As with the case of nausea and vomiting, the exact causes of constipation are unknown, making it difficult to design exact recommendations. Table 2 lists possible suggestions to help relieve some of the discomfort of constipation.

HEARTBURN

With heartburn, or gastroesophageal reflux, there is reflux or regurgitation of gastric contents into the lower esophagus, with subsequent pain and discomfort.[20] Heartburn during pregnancy occurs most frequently in the second or third trimester of pregnancy,[6,20] and has

Table 2
Recommendations for the Management of Constipation During Pregnancy

1. Include foods high in dietary fiber, such as whole grains (whole wheat bread, bran cereal, wheat cereal, grits, oatmeal), dried beans, raw fruit and vegetables (with skins), dried fruit, rice, pasta, nuts and popcorn.
2. Increase liquid intake. Warm water upon rising may be helpful.
3. Eat regular meals and snacks. Stress the importance of breakfast, as it is often skipped by teenagers. See #7.
4. Get regular exercise. Suggest a daily walk.
5. Foods with laxative properties may be helpful: prunes and other dried fruits and prune juice.
6. Tea and coffee may aggravate constipation due to their diuretic, dehydration effect. Colas may be a problem as well.
7. Encourage regular, unhurried bowel habits. Suggest attempting after breakfast each morning (when the gastrocolic reflex may be strongest).[1]
8. If the above suggestions do not relieve the constipation, mild laxatives may be prescribed by the health professional. However, mineral oil should be avoided due to it's interference with absorption of fat-soluble nutrients.

been reported to occur in 30% to 70% of all pregnant women.[20,21]

Etiology

1. Alteration of hormonal pattern.
   Increased amounts of progesterone which effects muscle relaxation and reduced stomach motility.[1,18,21,22] Progesterone has also been held responsible for reduction of muscle tone, including weakened esophageal sphincter function (lower sphincter pressure), allowing reflux to occur.[21]
2. Increased intra-abdominal pressure.
   The expanding uterus leads to decreased space and increased pressure.[1,18,23]

Management

Like nausea/vomiting and constipation, the discomfort of heartburn may be hard to eliminate. Improvement may often be achieved with some of the suggestions listed in Table 3.

Table 3
Recommendations for the Management of Heartburn During Pregnancy

1. Eat small, frequent meals during the day. Limit the volume of food eaten at one time. The last meal should be eaten at least two hours before retiring.[23]
2. High-fat foods should be limited.
3. Avoid foods known to produce discomfort to the individual. Problematic foods include: spicy foods, fats, chocolate, spearmint, peppermint, citrus fruit, tomato products, sodas and coffee.[22]
4. Reduce the amount of fluids with meals.
5. Eat in a relaxed, unhurried environment. Chew foods well.
6. Avoid lying down or bending immediately after a meal. Try remaining upright for two hours after eating. Pillows used to prop up the head may be helpful. Elevating the head of the bed by at least six inches has been shown to be effective.[22]
7. Wear loose-fitting clothes.
8. Deep abdominal breathing, rather than chest breathing.
9. Avoid smoking cigarettes.
10. When the above recommendations are ineffective, antacids used in moderation and under the supervision of a health professional may be helpful.
    a. Calcium carbonate antacids are preferred
    b. Aluminum-containing antacids reduce phosphate absorption and interact with trace minerals and are therefore not recommended.[6]
    c. Avoid preparations containing sodium bicarbonate (baking soda).[18]

PTYALISM

Although less common, some women experience ptyalism, an excessive production of saliva, during pregnancy.

Etiology

The basis of ptyalism is unknown. Theories include:

1. Starch ingestion may stimulate salivary glands.[7,18]
2. Increased acidity of saliva may stimulate greater saliva production.[7]
3. Nausea and vomiting may be associated with the condition.[7,18]
4. Hysterical inability to swallow the normal production of saliva.[18]

Management

Possible strategies to try to manage ptyalism during pregnancy are given in Table 4.

Table 4
Recommendations for the Management of Ptyalism

1. Decrease dietary starch.
2. Relieve nausea and vomiting.
3. Use container (such as small paper cup) or tissue for expectoration.
4. Use mouth wash and brush teeth.

LEG CRAMPS

Leg cramps during pregnancy occur most frequently during the last two months.[24]

Etiology

The exact cause of leg cramps during pregnancy is not known. Possible theories include:

1. Imbalance of body calcium, phosphorus[25] and magnesium.[18]
2. Impaired circulation or nerve supply due to pressure from growing uterus.[18]

Management

See Table 5 for suggestions in the management of leg cramps.

Since the causes of the discomforts of pregnancy have not been well established, complicated by the fact that severity may vary greatly from one individual to another, it is difficult to make definite recommendations. This chapter attempts to suggest possible strategies, even if controlled studies have not been done.

Encourage the adolescent to try a few of the recommendations for the discomfort she is suffering from, reinforcing the idea that everyone is an individual. One suggestion might help relieve the discomfort for one teenager; while not helping another. Results will vary among individuals. She should try the suggestions that are best suited for her situation.

Table 5
Recommendations for the Management of Leg Cramps During Pregnancy

1. Increase circulation with general exercise.
2. Massage muscle; apply warm compress; straighten cramped leg and flex foot.
3. Periodically elevate legs during the day. Avoid prolonged standing.
4. Wear flat-heeled shoes.
5. No controlled studies have shown conclusive proof that leg cramps in pregnancy is due to the decrease in ionized calcium.[8]
   - Dietary modifications may or may not help. Increase dietary calcium and decrease dietary phosphorus (elevate serum calcium).
   - Since milk products are high in calcium and high in phosphorus, possible suggestions:
   - Reduce intake of milk products and supplement with non-phosphate calcium salts (e.g., calcium lactate);
   - Continue recommended intake of milk products. Use aluminum hydroxide supplements to promote formation of insoluble aluminum phosphate formation in the gut.[25]

Since milk products have high nutritive value, eliminating them appears inappropriate. Reducing other dietary phosphorus sources, such as sodas and processed foods before reducing milk products is recommended.

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11

EXERCISE DURING PREGNANCY

Irene Alton, M.S., R.D.

An increasing number of adolescent females are participating in recreational and competitive sports, body building, and other fitness activities. During pregnancy, they may want to remain physically active. In a recent survey of pregnant adolescents, 60% exercised more than four times per week prior to becoming pregnant, while 50% exercised at this level during pregnancy (Health Start Data, 1987). In contrast, many teenagers tend to decrease their level of exercise during pregnancy and may need encouragement to remain physically active.

BENEFITS OF EXERCISE DURING PREGNANCY

An important aspect of a healthy lifestyle, physical exercise enhances muscular strength, endurance, flexibility, and heart and lung efficiency. The potential advantages of exercise during pregnancy, which may be especially important to the adolescent, are:

- Maintenance or improvement of fitness level.[1-4]
- An enhanced self-image and sense of well-being.[5,7]
- Less isolation from non-pregnant peers.
- Fewer physical discomforts (e.g., headache, backache, fatigue, shortness of breath).[6]
- Less likelihood of excessive weight gain.
- Improved posture.[8]
- More rapid postpartum recovery.[8]

PHYSIOLOGY OF PREGNANCY

Pregnancy involves extensive physiological changes which, in combination with exercise, could have significant implications for the maternal-fetal system:

- Blood volume expands 30-40% above pre-pregnant levels.[7,8]
- Resting cardiac output increases 30-40% as heart rate and stroke volume (amount of blood pumped out of ventricles per beat) increase.[4,9] After 32 weeks gestation, a decrease in cardiac reserve occurs which may lower exercise tolerance.[8]
- Resting oxygen consumption increases 15-30%.[10,11] In late pregnancy, oxygen reserve may be decreased.
- Hyperventilation increases as progesterone affects the respiratory center, and as the enlarging uterus displaces the diaphragm upward.[7,11]
- Progesterone, relaxin, estrogen, and cortisol soften and stretch the connective tissue. Laxity and instability of ligaments and joints and increased risk of musculoskeletal injury may result.[1,7,9] These changes may persist for 10-12 weeks postpartum.[8]
- Changes in center of gravity occur as the uterus and breasts enlarge, resulting in balance problems, lumbar lordosis (sway back), and back and hip strain.[9]
- Pressure exerted on the vena cava by the enlarging uterus may result in decreased venous return and cardiac output in some individuals in later gestation when exercising in the supine position (supine hypotension). Symptoms may include dizziness and shortness of breath.[7]

SAFETY OF EXERCISE DURING PREGNANCY

Although concerns have been expressed about the safety of exercise during pregnancy, they appear to be primarily theoretical. Despite a lack of large, well-controlled prospective studies, the majority of research indicates physiologic adaptations which protect the fetus and support the tolerance and safety of moderate aerobic exercise (up to 75% maximal aerobic capacity) in conditioned pregnant women:

- Despite a reduction of uterine blood flow by as much as 25% during strenuous exercise, placental blood flow appears to increase.[1,10,11]
- Plasma volume decreases as plasma filtrate is forced across the capillary membranes of exercising muscles, resulting in hemoconcentration,

increased oxygen extraction, and increased oxygen-carrying capacity. Increased concentration of glucose and other nutrients has also been noted.[10] The uterine oxygen and nutrient environment thus remain relatively constant.

- Exercising women in good physical condition appear to experience a lesser reduction in uterine blood flow during exercise.[10]
- Pregnant women dissipate heat 33% more efficiently than non-pregnant women, and thermal balance is maintained during moderate, aerobic exercise as measured by vaginal and core temperature.[8,13]
- Fetal activity and breathing is not affected, and fetal hypoxia or stress have not been demonstrated.[10,14]
- Fetal heart rate may be transiently altered, but is essentially unaffected.[1,3,9,10,15]
- The length of gestation is not affected, and fetal growth and development is not compromised.[3,5,15,16]
- No increase in perinatal mortality or morbidity has been observed.[2,8,9]

ASSESSMENT

Obtaining the following information will be useful in counseling pregnant adolescents regarding exercise during pregnancy. This assessment can be done by a nutritionist, nurse, nurse midwife, physician, or health educator. The information is ideally obtained by personal interview or, if necessary, a self-administered questionnaire (see Appendix C).

At the initial visit, assess the following:

- Pre-pregnant exercise program
  - —Types of exercise
    - * Competitive and recreational sports activities
    - * Weight lifting/body building activities
    - * Other school or leisure-related activities (e.g., walking, bicycling, aerobic dance/exercise classes, roller skating, etc.)
  - —Frequency of exercise
  - —Duration of exercise sessions
  - —Intensity of exercise
- Current exercise patterns (as above)
- Goals and expectations for continuing physical activity during pregnancy

At subsequent visits, current exercise patterns should also be reviewed (once during second and third trimesters or more frequently, if indicated).

COUNSELING AND EDUCATION

RECOMMENDATIONS FOR EXERCISE DURING PREGNANCY

The goal of exercise during pregnancy, as stated by the American College of Obstetricians and Gynecologists, "should be to maintain the highest level of fitness consistent with maximum safety."[7] Accordingly, this group and other authors have made recommendations for exercise during pregnancy based on the prevention of fetal injury and maternal exhaustion, hypothermia, musculoskeletal injury, and hypotension. Geared to the majority of pregnant women, these recommendations tend to be conservative, and may need to be individualized for those in exceptional physical condition or those highly skilled. Physically fit adolescents can generally continue most prepregnancy activities, with some modifications. It is inadvisable for those in poor physical condition (e.g., extremely obese or sedentary) to begin an intensive exercise program during pregnancy. Walking, swimming, and moderate stretching exercises, however, would be beneficial to most adolescents.

Types Of Exercise

Aerobic exercises, which supply oxygen to the exercising muscles through repetitive, rhythmic motions, best promote cardiorespiratory fitness. These are activities which use large muscle groups and involve deep breathing and increased heart rate.

Exercise Not Contraindicated During Pregnancy

Table1 lists examples of exercises usually considered appropriate for pregnancy. Some modifications may be indicated, particularly as pregnancy progresses, to limit discomfort or fatigue.

Table 1
Types of Exercise Not Contraindicated During Pregnancy

- Walking
- Swimming
- Bicycling
- Jogging
- Running
- Rowing
- Dancing
- Tennis
- Cross-Country Skiing
- Softball
- Bowling
- Weight Lifting (light)
- Nautilus (modified)
- Prenatal Exercise Programs
- Pregnancy Conditioning Exercises
- Golfing
- Water Aerobics
- Low Impact, Low Intensity Aerobics

- Bicycle seats should be adjusted so that the heel is two inches below the pedal when the leg is fully extended to prevent leg and back strain.[1] Stationary bicycles can be used if balance becomes a problem.
- Running may require shorter distances, slower speeds, flatter terrain, and more frequent rest periods. Alternating walking with running may be helpful.
- To avoid lower back strain while weight lifting, dead lifts, bent rows, and squats are not recommended.[9]
- Activities involving straining and breath holding (Valsalva's maneuver) should be avoided.[7]
- Nautilus should be limited to upper body and leg strengthening exercises using lighter weights, fewer repetitions, and avoiding straining.[9]
- Prenatal exercise programs should be taught by qualified instructors.
- The pelvic tilt will strengthen abdominal muscles and decrease lumbar lordosis. Instruct the adolescent to stand, lie, or sit with feet hip-distance apart and knees slightly bent, while the muscles of the abdomen and buttocks are contracted. The pelvis is thrust forward and the pelvic bone rolled upward.[7] Repeat several times a day.

Exercise Contraindicated During Pregnancy

Table 2 lists examples of exercises usually considered inappropriate for pregnancy. They require a high degree of balance and coordination, quick movements, and may involve risk of falling or risk of fetal trauma.

- Exercises which strain the lower back, stress ligaments, cause knee trauma, or promote separation of the symphysis pubis (junction of public bone) should be avoided. These include full sit-ups, sitting cross-legged, leg lifts, side leg swings, toe touches, squatting, and deep knee bends. Jerky motions, hopping, jumping, twisting, or sudden changes in direction are also contraindicated.[1,7,12] Joints should not be extended beyond the normal range of motion.
- Distance or marathon running could result in chronic fatigue or exhaustion.[9]

Table 2
Types of Exercise Contraindicated During Pregnancy

• Contact sports	• Downhill skiing
• Racquet ball	• Mountain climbing
• Skateboarding	• Gymnastics (later pregnancy)
• Break dancing	• Horseback riding
• Sky diving	• Distance/marathon running
• Sliding	• Water skiing
• Surfing	• Scuba diving
• Diving	• Roller skating
• Some calisthenics	• Ice skating

- Water skiing may result in forceful entry of water into the uterus, which could cause miscarriage.[9]
- Scuba diving may be associated with hypoxia, hypothermia, or decompression sickness,[9] and in the first trimester may result in fetal teratogenicity.[8-10]

Exercise Guidelines

It is recommended that the frequency, length, and intensity of exercise sessions should not be increased above pre-pregnancy levels. Competition or pre-set performance goals should also be avoided.

Exercise Frequency and Duration

- Aerobic exercise for 30-45 minutes per session, interspersed with two- to three-minute rest periods, is recommended three-to-four times per week. Irregular exercise or a sudden increase in exercise level may result in muscle strain.[1,7,11,12]
- If an exercise program is initiated in pregnancy, aerobic exercise for 15-20 minutes, gradually increasing to 30 minutes over a six-week period, is recommended.

Exercise Intensity

- Exercising 60-70% of maximal aerobic capacity is recommended during pregnancy. Since maximal heart rate in an adolescent is 200 beats per minute(bpm), the desirable target heart rate is 120-140 bpm.[7,17]
- Instruct the adolescent to monitor her pulse rate at the wrist or neck before, after, and two-to-three times during exercise (count to 10 seconds and multiply by six to obtain bpm).
- Five minutes after exercise, the heart rate in a pregnant adolescent will be approximately 115 bpm, with return to resting heart rate (65-95 bpm) by 15 minutes after exercise ceases. The adolescent should be cautioned to exercise at a slower pace if the heart rate is higher.
- Excessive breathlessness should be avoided. (It should be possible to carry on a conversation while exercising.)
- Exercise intensity should be decreased as pregnancy advances. (Increased uterine blood flow is needed to support more rapid fetal growth, while cardiac reserve is decreased. In addition, respiratory effort is increased, energy demands are increased for weight bearing exercises as body weight increases[12] and fatigue and discomfort are more likely in later pregnancy.)
  - —Maintaining the pulse rate at 120-140 bpm will result in decreased exercise intensity, since the resting heart rate increases as pregnancy progresses.
  - —Exercising more slowly with fewer repetitions and substitutions, such as brisk walking or running and doubles for singles tennis, will also lower exercise intensity.

Before and After Exercise

- An extended (10 to 15 minute) warm-up and cool-down period (e.g., walking, stationary bicycling on low resistance, followed by gentle stretching) is essential before and after exercise sessions. This will reduce the risk of ligament and back strain, ensure a safe cardiovascular response, normalize metabolic rate and respiration, and prevent pooling of blood in exercising muscles.[1,7,9,12]
- Resting for 10 minutes on the left side after exercising may be advisable to enhance uterine blood flow by taking uterine pressure off the vena cava.[12]
- Elevating the legs after exercise may be advisable to increase venous return and prevent hypotension.[18]

Exercise Environment

Dehydration and hypertension (which may be associated with neural tube defects, particularly during early pregnancy) should be avoided.[7,12]

- Exercise should not be done while febrile, or in extremely hot, humid weather (e.g., temperature + relative humidity $\geq$150).
- Exercising during a cooler time of day in light clothing is recommended.
- Hot tubs and saunas should be avoided.

A tightly carpeted or wooden floor will reduce the risk of slipping.[7]

Walking or running on a cushioned track or grass will increase comfort and reduce the risk of injury.

Well-cushioned shoes which provide good support will aid balance and increase comfort.

A well-fitting maternity bra will increase comfort and minimize stretching of ligaments of Cooper.[9]

NUTRITION GUIDELINES

Weight loss should not result from exercise during pregnancy. An energy intake which includes the energy demands of exercise is essential for normal weight gain and fetal growth. The energy expended during exercise is similar during pregnancy and non-pregnancy. However, with weight-bearing exercise, such as running, walking, or aerobics, energy expended increases in relation to increased body mass (e.g., approximately 20%).[1,2] Table 3 lists the approximate energy expended during various physical activities.

An ample fluid intake is essential to prevent dehydration, which is more likely to occur during pregnancy (10-12 cups per day, including one to two cups of cold water before exercise, and one-half to one cup every 15 minutes during exercise, and two to three cups after exercise). Thirst may be depressed during exercise and cannot be relied on to assure an adequate fluid intake. Clear urine is an indication of adequate hydration.

An increased intake of carbohydrate will prevent hypoglycemia, which occurs more readily during pregnancy, particularly at later stages when fetal glucose needs are higher. Complex carbohydrates (i.e., breads, cereals, pastas, etc.) or milk, fruit, or fruit juice should be consumed one to two hours before and after exercise sessions.

An increased protein intake is not indicated and may promote water loss and dehydration.

An increased vitamin intake is not needed and may result in hypervitaminosis.

Table 3
Approximate Caloric Expenditure During Physical Activities (Moderate Intensity) According to Body Weight

Activity	Caloric Expenditure per Hour			
Body Weight (lbs)	100	125	150	175
Bicycling	198	250	305	355
Rowing	540	685	825	970
Running	425	535	650	760
Skating	225	285	345	405
Skiing (cross-country)	465	585	710	880
Swimming (breast stroke)	285	360	435	510
Tennis	275	345	420	490
Walking	260	330	400	470

Based on Kuntzelman, C.: Activetics - The diet-free way to lose pounds and inches. New York, P.H. Wyden, 1975.

EXERCISE PRECAUTIONS

Exercise sessions should be discontinued if any of the following occur:[8,12]

- Dizziness
- Numbness
- Chest, back, hip, or pubic pain
- Contractions
- Vaginal bleeding
- Headache
- Nausea
- Muscle weakness

If supine hypotension is experienced, exercise involving lying on the back should be avoided.

Exercise is not advisable if any of the conditions in Table 4 is present.[1,2,7,9-11]

Table 4
Contraindications to Exercise During Pregnancy

- Pregnancy-induced hypertension
- Hypertension
- Severe anemia
- Hemoglobinapathies
- Cardiac disease
- Thyroid disease
- Thrombophlebitis
- Uncontrolled diabetes
- Polyhydraminos
- History of three or more spontaneous abortions
- Multiple gestation
- Cervical incompetence
- Placenta previa
- Premature labor
- Ruptured membranes
- Bleeding
- Intrauterine growth retardation
- Postdatism
- Severe infection

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Resources

Information on exercise and pregnancy can be obtained from the following sources:

American College of Obstetricians and Gynecologists
600 Maryland Avenue Southwest
Suite 300 East
Washington, DC 20024

Melpomene Institute for Women's Health Research
2125 East Hennepin Avenue
Minneapolis, MN 55413
(612) 378-0545

12

SUBSTANCE USE DURING PREGNANCY

Irene Alton, M.S., R.D.

Heavy tobacco and alcohol use as well as increasing rates of cocaine and other drug use have been noted among adolescent females.[1-3] Chemical use and pregnancy in adolescents appear to be influenced by some of the same behavioral factors[4] and may often occur simultaneously. Pregnant adolescents have demonstrated higher smoking rates and heavier drinking patterns than older pregnant women.[5,6] Multiple or heavy drug use (most commonly of marijuana, cocaine, and amphetamines) may further complicate adolescent pregnancy. Results of a recent survey of chemical use patterns in pregnant adolescents under 18 years of age are summarized in Table 1.

Substance abuse may be a significant factor in perinatal mortality and morbidity among adolescents and their infants. Its effects may include:

- Inadequate prenatal care
- Increased health problems, including risk of AIDS
- Compromised nutritional status and inadequate weight gain
- Higher rates of obstetrical complications
- Psychosocial, economic, and legal problems
- Parenting difficulties
- Higher rates of child abuse and neglect

Table 1
Chemical Use in Pregnant Adolescents

Substance	Before Aware of Pregnancy		At First Prenatal Visit
Cigarettes	Any level	80%	62%
	Over 1 pk/d	39%	10%
Alcohol	Any level	52%	18%
	Heavy	8%	5%
Marijuana		41%	9%
Other drugs (amphetamines, cocaine, LSD, barbiturates)		18%	5%

Source: Health Start Program, St. Paul, MN, 1988 (unpublished data).

BACKGROUND INFORMATION

ASSOCIATED RISKS

The adverse effects of chemicals used during pregnancy are determined primarily by:

- **Timing:** Substance abuse adversely affects pregnancy outcome at all states of gestation.[7] During embryonic development (first eight weeks), organ damage and congenital malformations may occur. From the third month until term, central nervous system (CNS) damage and growth retardation may result.
- **Dosage:** The degree of risk is related to the amount of substance used. Regular, heavy exposure and binge use are of particular concern.
- **Duration:** Usage throughout pregnancy is associated with the greatest risk.

Table 2
Risks Associated with Substance Use in Pregnancy

SUBSTANCE	PERINATAL	INFANCY/CHILDHOOD
Alcohol	Abruptio placentae Spontaneous abortion Stillbirth Prematurity Intrauterine growth retardation (IUGR) Congenital malformations	Failure to thrive (FTT) Neurobehavioral abnormalities Mental retardation
Amphetamines	Reduced maternal weight gain	Tremors Irritability Drowsiness Feeding difficulties
Barbiturates	Intrauterine growth retardation (IUGR)	Seizures Respiratory depression
Caffeine	Spontaneous abortion Lowered infant birth weight	
Cocaine	Abruptio placentae Spontaneous abortion Stillbirth Prematurity Precipitous delivery Intrauterine growth retardation (IUGR) Congenital anomalies Fetal/newborn distress Cerebral infarctions	Neurobehavioral changes Sudden Infant Death Syndrome (SIDS) Seizures Tremulousness Irritability Feeding difficulties
Heroin	Pregnancy-induced hypertension Abruptio placentae Spontaneous abortion Stillbirth Intrauterine growth retardation (IUGR) Prematurity Neonatal death Intracranial hemorrhage	Seizures Irritability Poor consolability Feeding difficulties Vomiting Diarrhea Sweating
Inhalants	Congenital anomalies Central nervous system abnormalities	Mental retardation Growth impairment
Marijuana	Prematurity Intrauterine growth retardation (IUGR) Facial anomalies Labor and delivery effects	Neurobehavioral changes
Phencyclidine Hydrochloride (PCPs)	—	Tremors Rigidity Hypersensitivity to touch and noise Developmental delay
Talwin and Pyribenzamine (T's and Blues)	—	Intrauterine growth retardation (IUGR) Neonatal withdrawal
Tobacco	Abruptio placentae Spontaneous abortion Stillbirth Intrauterine growth retardation (IUGR) Congenital malformations	Sudden Infant Death Syndrome (SIDS) Growth deficits Impaired intellectual development Respiratory illness

Sources: References 1-7, 9, 10, 12, 13, 16-28.

- **Number of substances:** Use of multiple drugs (two or more), or the combination of drugs, alcohol, and/or tobacco compounds their effects. For example, the risk of low birth weight is nearly doubled with combined tobacco and alcohol use, compared to the use of either alone.[8]
- **Environmental factors:** Factors such as poor nutrition or health status may intensify the adverse effects of chemicals.[7]
- **Individual susceptibility:** Genetic make-up may predispose some individuals to greater risk from chemical use.[7]

Perinatal risks associated with chemicals used during pregnancy, as well as longer term effects during infancy and childhood, are summarized in Table 2. Although there is a lack of research on the effects of substance use on adolescent pregnancy outcome, these risks are likely to be comparable, and may be more pronounced than those found in adult pregnant women.

Alcohol

Alcohol rapidly crosses the placenta and distributes in maternal and fetal blood at comparable levels of concentration. Low fetal levels of alcohol dehydrogenase, the enzyme system that metabolizes alcohol, result in prolonged exposure and increased vulnerability to its effects. Alcohol and its metabolites appear to have direct, toxic effects on placental and fetal cellular growth, as well as adverse effects on the adolescent's nutrition and health status.

- Risk of spontaneous abortion may be doubled with one to two drinks per day, and more than 3.5 times higher with three or more drinks daily.[7]
- Lowered birth weight may occur with one to two drinks per day.[10] Beer may have a more pronounced effect on birth weight than other alcoholic beverages.[26]
- Binge drinking early in pregnancy may be associated with neural tube defects,[27] while chronic, heavy use (e.g., six or more drinks per day) may result in craniofacial abnormalities or cardiovascular, hepatic, musculoskeletal, or genitourinary anomalies.[12, 13]
- Growth retardation continuing into early childhood may occur, despite adequate stimulation and nutrition.[13]
- Irritability, hyperactivity, sleep disturbances, delayed motor development, and feeding difficulties may occur.[13]
- Mild to severe mental retardation may occur in infants of chronic, heavy alcohol users.[14]

Heavy alcohol use throughout pregnancy may result in the Fetal Alcohol Syndrome (FAS). The diagnostic criteria for FAS,[13] which affects 1-2 per 1,000 live births, are listed in Table 3.

Table 3
Fetal Alcohol Syndrome Diagnostic Criteria

Prenatal/Postnatal Growth Deficiency	Weight, length, and/or head circumference below the 10th percentile, NCHS growth standards
Central Nervous System Dysfunction	Neurologic or behavioral abnormalities Developmental delay Mental retardation
Facial Dysmorphology (at least two of these)	Microcephaly Small eyes Short palpebral fissures (eye openings) Epicanthus (vertical fold of skin on side of the nose, covering part of eye opening) Strabismus (crossed eyes) Flat maxillary area Short, upturned nose Underdeveloped philtrum (groove between nose and upper lip) Thin upper lip Large, low-set ears which are rotated back Receding chin

Caffeine

In addition to being a central nervous system stimulant, caffeine may have the potential to alter cellular growth, division, and hormonal activity.[23] Slower clearance from the maternal system during later pregnancy and fetal lack of the enzyme to metabolize it increase fetal exposure to the drug. Adolescents may obtain appreciable amounts of caffeine through the consumption of carbonated beverages.

Caffeine appears to have a dose-dependent adverse effect on infant birth weight, independent of maternal energy intake, weight gain, or cigarette smoking.[30] Caffeine intakes in excess of 300 mg/day have recently been associated with a 105-gram decrease in birth weight.[23]

Caffeine intakes from all sources in excess of 150 mg/day have been associated with higher rates of late first or second trimester abortions.[24]

Cocaine

Cocaine, particularly in the more accessible form of crack, is an extremely addicting and potent drug which readily crosses the placenta. A central nervous system stimulant, cocaine raises norepinephrine levels with effects including vasoconstriction, hypertension, and tachycardia.[18] In large doses, seizures, strokes, myocardial infarction, respiratory failure, and sudden death may occur.[28]

Cocaine is metabolized more slowly during pregnancy. Fetal exposure to the drug is further increased by low levels of plasma cholinesterase, the enzyme which metabolizes cocaine.[2] Alternative metabolic pathways result in metabolites (benzoylecgonine, ecgonine) which are more active and have longer half-lives than cocaine.

Some of the risks (abruptio placentae, lower birth weight, prematurity, congenital anomalies, and impaired orientation and motor ability in the infant) have been observed with use in the first trimester only.[29,30]

- Abruptio placentae and stillbirth may be associated with norepinephrine induced placental vasoconstriction and uterine contraction.[2] Placental and uterine vessel damage in early pregnancy may also be involved.[23]
- Sudden onset of labor and precipitious delivery may result from uterine contractions and sudden hypertension after cocaine use.[15]
- Reduced infant weight, length, and head circumference may result from vasoconstriction of placental blood vessels, with subsequent reduction in fetal oxygen and nutrient supply.[19]
- Spontaneous abortion and anomalies, including those of the skull, heart, and genitourinary tract, may be related to early pregnancy use.[20]
- Perinatal infarctions of the cerebrum or small bowel may result from sudden hypertension.[20]
- Fetal arrythmias and tachycardia, hypertension, and respiratory distress syndrome may occur in the newborn.[2]
- Tremors, irritability, and rigidity, as well as seizures and apnea, may persist for several months in the infant.[19]
- The risk of sudden infant death syndrome may be increase five- to 10-fold in infants prenatally exposed to cocaine.[21]

Marijuana

Fetal levels of tetrahydrocannabinol (THC), the primary psychoactive component of marijuana, peak two to four hours after maternal smoking of the drug. Highly lipid soluble, THC accumulates in fatty tissues and may alter the reproductive hormonal system.[15]

- Marijuana use six or more times per week may result in shorter gestation.[17]
- The high carbon monoxide levels and constricted uterine blood flow produced by marijuana may result in fetal hypoxia and growth retardation.[15]
- Facial anomalies, similar to those characteristic of heavy drinking, may occur, particularly when marijuana is combined with alcohol or polydrug use.[7]
- Premature labor, shorter gestation, and precipitous or prolonged labor may occur more frequently in chronic marijuana users.[17]
- Irritability, tremulousness, and altered visual responses may be more likely in neonates of marijuana users.[16]

Tobacco

The vasoconstrictive effect of nicotine and hypoxemic effect of carbon monoxide associated with cigarette smoking appear to reduce placental transfer of oxygen and nutrients to the fetus. Adverse effects on fetal development and well-being may result from smoking as few as five cigarettes per day.[4]

- Higher rates of abruptio placentae (premature detachment of the placenta), associated with an increased risk of stillbirth, may occur despite smoking cessation in pregnancy.[8]
- Risk of spontaneous abortion may be nearly doubled in smokers, compared to non-smokers.[6]
- Rates of low birth weight (under 2500 grams) may be increased over 50% in infants of light smokers and 130% in those of women smoking more than 20 cigarettes per day.[9]
  - —Smoking may account for 15% of low birth weight and up to 40% of small for gestational age infants in adolescent pregnancies.[5]
  - —Average birth weight may be reduced by as much as 222 grams in infants of adolescent smokers.[4]

—Weight, length, and head circumference are proportionately reduced despite adequate weight gain and nutrient intake.

—Passive smoking may reduce birth weight by as much as 200 grams.[31]

—Smokeless tobacco has also been associated with reduced birth weight.[9]

- Sudden Infant Death Syndrome (SIDS) may occur 2.5 times more frequently in infants of women who smoked during pregnancy.[8]
- Risk of congenital anomalies such as cleft lip and cleft palate may be doubled in infants of heavy smokers.[8]
- Respiratory illnesses in childhood, such as bronchitis, may be more strongly associated with maternal smoking during pregnancy than passive exposure to cigarette smoke after birth.[10]
- Children of smoking women have been observed to have lower reading and math skills when followed up to 16 years of age.[8]

NUTRITION-RELATED CONCERNS

In addition to direct, adverse perinatal effects of chemical use, nutrition-related consequences may further compromise pregnancy outcome (Table 4).

- Appetite suppression associated with chronic or heavy chemical use reduces the quantity, quality, and frequency of food intake. Cocaine is a particularly powerful anorectic.
- Alcohol, containing 7 kcal/g, may displace nutrient-containing energy sources in the diet. For example, one pint of 86-proof alcoholic beverage provides approximately 1,000 non-nutritive calories, nearly one-half of the mean recommended intake for a pregnant adolescent.

Table 4
Potential Effects of Chemical Use on Nutrition Status

Reduced nutrient intake
Decreased nutrient absorption
Increased nutrient losses
Altered nutrient synthesis, metabolism, and utilization
Inadequate weight gain
Anemia
Decreased financial resources for food

- At chronic, high levels of intake, alcohol is metabolized by an alternate pathway which reduces its energy availability.
- Low weight gain has been observed in pregnant smokers despite an adequate energy intake. Cigarette smoking may interfere with the conversion of energy to gestational weight gain.[25]
- Nausea, vomiting, diarrhea, or increased urinary losses of nutrients may occur with chronic or heavy alcohol use.
- High intakes of alcohol may alter the metabolism and utilization of nutrients such as amino acids, folate, zinc, and vitamin B_6.
- Heavy cigarette smoking may compromise vitamin C status.
- High intakes of caffeine may decrease the absorption and/or increase urinary losses of thiamin, zinc, iron, and calcium.[32]

ASSESSMENT

A systematic and thorough assessment of chemical use patterns is an essential component of the obstetrical care of all adolescents. This assessment can be made by a nutritionist, nurse, nurse-midwife, physician, social worker, or health educator. The information is best obtained by personal interview in a direct, non-judgmental, and caring manner. An explanation of the purpose of the interview and assurance of confidentiality will help to elicit the adolescent's cooperation and encourage accurate responses. Incorporation of questions related to chemical use into a lifestyle health assessment, which includes other topics such as exercise, may be less threatening to the adolescent (see Appendix C).

INITIAL VISIT

At the first prenatal visit, assess the following:

- Previous chemical use
- Timing of chemical use in pregnancy
- Types of chemicals used
- Amounts of chemicals used
- Frequency of use
- Methods of use (e.g., smoking, intravenous, intranasal)
- Combinations of chemicals used
- Age use began
- Reasons for use (e.g., coping mechanism, low self-esteem, peer pressure, recreation, etc.)
- Level of self-esteem
- Attitude toward drug use
- Reactions of partner, friends, and family members to use
- History of decreasing or stopping use, history of chemical dependency treatment

- Plans to decrease or stop use during and after pregnancy
- Chemical use patterns and history of chemical dependency treatment of partner, friends, and family members

Other factors to keep in mind throughout the interview:

- Avoid, when possible, questions which can be answered with a "Yes" or "No."
- Ask about each type of substance separately, progressing from the less threatening, over-the-counter and prescription drugs to cigarettes, alcohol, and illicit drugs. Use the more familiar "street" names for drugs.
- Chemical use begun at an early age may suggest progression to polydrug use.
- Use of chemicals within the past month may be indicative of current use.
- Assume use and suggest relatively high levels of use to encourage the adolescent to report amounts honestly.7
- Method of use will indicate extent of drug involvement and possible associated risks.
- Summarize information given and clarify unclear responses.
- Determine level of motivation to make positive changes and potential strengths and barriers.
- Document findings in medical record.

Other Indicators of Chemical Use

In addition to information obtained through the interview, general appearance, affect, or clinical signs noted at clinic visit(s) may indicate possible substance abuse (Table 5).

Table 5
Possible Indicators of Chemical Use

Poor hygiene
Odor on breath or clothes (marijuana, alcohol, glue)
Needle marks, tattoos
Gang or cult membership
Dilated or constricted pupils
Watery eyes or nose
Confusion, slurred speech, poor coordination or drowsiness
Anxiety, hyperactivity
Varying moods
Depression or euphoria
Elevated blood pressure or heart rate
Weight loss or inadequate weight gain
Non-compliance with clinic visit schedule
Legal, school, or family problems; "on the run"

Urine drug screening of the adolescent and her newborn may be indicated if substance abuse is suspected but denied. Levels of substance use which may place the adolescent at high or moderate risk for adverse pregnancy outcome are summarized in Table 6.

Table 6
Amount/Frequency of Chemical Use and Associated Risk

Substance	High Risk	Moderate Risk
Cigarettes	≥ 10/day	< 10/day
Alcohol	≥ 2 drinks/day	≤ 1 drink/day*
Marijuana	≥ 1 joint/day	< 1 joint/day
Other illicit drugs	≥ 1 time/week	< weekly
Caffeine	> 300 mg/day**	151-300 mg day**

*1 drink = 0.5 ounce absolute alcohol: 12 oz beer
10 oz wine cooler
4 oz wine
1 oz liquor

** See Table 7

Table 7
Caffeine Content of Foods/Beverages

	mg caffeine
Coffee - 5 oz Drip	110-164
Coffee - 5 oz Percolated	99-134
Tea - 5 oz	21-50
Soft Drinks - 12 oz (Colas, Dr. Pepper, Tab, Mountain Dew, Mello Yello, Mr. Pibb, Big Red)	38-58
Jolt	72
Chocolate cake - 1 slice	14
Milk chocolate candy - 1 oz	6
Chocolate milk/hot chocolate - 8 oz	5

Source: Pennington, J., Church, H.: *Food Values of Portions Commonly Used.* Cambridge, MA: Harper and Row, 1985.

Other Indicators of Risk Status[7]

High Risk

- Heavy use of one or more substances in early pregnancy
- Heavy use of one or more substances since awareness of pregnancy
- Resistance to decreasing or stopping heavy substance use and/or refusal of chemical dependency referral

Moderate Risk

- Heavy use of one or more substances prior to pregnancy
- Resistance to decreasing or stopping substance use

SUBSEQUENT VISITS

Reassessment of chemical use patterns is essential throughout pregnancy since relapses or additional stresses may result in increased use. Briefly determine current level of substance use at each visit.

EDUCATION AND COUNSELING

The pregnant adolescent may be motivated to make positive lifestyle changes out of concern for her developing infant. Although the sooner substance use is stopped in pregnancy the better the outcome, benefits of stopping or decreasing use at any stage of pregnancy may include:

- Improved health and nutrition status of the adolescent
- Improved self-esteem and sense of well-being of the adolescent
- Opportunity for fetal catch-up growth and improved birth weight, particularly with cessation of tobacco and alcohol use before the third trimester.[13,33]
- Less severe consequences of chemical use
- Avoidance of pre-term labor
- Decreased risk of SIDS

COUNSELING STRATEGIES

- Summarize the findings of the assessment.
  - —Praise positive changes already made.
  - —Express areas of concern.
- Explain in simple, concrete terms concerns of substance use in pregnancy.
  - —Through use of visual materials of the placenta and fetus, show that chemicals the adolescent uses reach and may harm her developing infant.
  - —Discuss possible outcomes meaningful to the adolescent, such as an infant which may be more difficult to care for, less attractive, less intelligent, etc.[4]
- Advise abstinence from tobacco, alcohol, and illicit drugs throughout pregnancy, since a safe level or time of use is not known.
- Advise moderation in caffeine intake (< 150 mg/day).
- Provide support and encouragement to stop chemical use.
  - —Using a positive approach, focus on the likelihood of a healthier infant rather than on possible damages which may have already occurred.[13]
  - —Avoid guilt or scare tactics and judgmental, confrontative attitudes which may result in rebellion, higher levels of use, or failure of the adolescent to return for care.
  - —Emphasize that it is never too late in pregnancy to make changes.

INTERVENTION STRATEGIES

- Set realistic short-term goals with the adolescent, based on the role of drug use in her life.
- Outline goals in the adolescent's care plan.
- Use a written contract for behavior change.
- Help the adolescent establish an incentive/reward system for progress made.
- Write recommendations on a prescription form.[4]
- Encourage alternative habits and activities (e.g., sugarless gum, exercise) and avoidance of people and situations that encourage use.
- Ask the adolescent to keep a daily diary of substances used (see Appendix C).
- Employ values clarification, decision-making, self esteem building, and stress management techniques.[34]
- Encourage involvement and support of the adolescent's partner, friends, or family members.
- Use peer support groups, when possible.
- Encourage adolescents who smoke to identify physical or psychological dependency and use appropriate cessation methods (see Appendix C).
- Do not prescribe nicotine-containing chewing gum.
- Emphasize that marijuana use is not appropriate for stimulation of appetite or as an aid for nausea in pregnancy.
- Using a health care team approach, incorporate counseling within routinely scheduled prenatal visits. See the adolescent at more frequent intervals (e.g., one to two weeks) and include phone contacts between visits, if possible.

REFERRAL

If there is no decrease in substance use within two weeks, continue to coordinate prenatal care services and make a referral to an appropriate resource specializing in adolescent care. These may include:

- Inpatient treatment program
- Outpatient treatment program
- Community treatment programs, groups homes, etc.
- Alcoholics Anonymous, Narcotics Anonymous, smoking cessation programs, etc.

FOLLOW-UP

At each prenatal visit:

- Monitor progress
- Praise positive changes made
- Discuss setbacks in a non-punitive manner
- Set new goals
- Reinforce importance of abstinence
- Document progress in medical record

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RESOURCES

Information on substance use for counseling pregnant adolescents can be obtained from the following sources:

American College of Obstetricians
and Gynecologists
600 Maryland Avenue SW
Suite 300 East
Washington, DC 20024

American Lung Association
1740 Broadway
New York, NY 10010
(212) 206-6770

American Council on Drug Education
204 Monroe Street
Suite 110
Rockville, MD 20850

Fetal Alcohol Education Program
Boston Univezarsity Medical Center
7 Kent Street
Brookline, MA 02146
(617) 232-7557

Healthy Mothers Healthy Babies Coalition
600 Maryland Avenue SW
Suite 300 East
Washington, DC 20024
(202) 638-5577

March of Dimes
1275 Mamaroneck Avenue
White Plains, NY 10605

National Center for Education in
Maternal and Child Health
38th and R Streets NW
Washington, DC 20057
(202) 625-8400

National Clearinghouse for
Alcohol and Drug Information
P.O. Box 2345
Rockville, MD 20852
(301) 467-2600

National Institute on Alcohol
Abuse and Alcoholism
U.S. Department of Health
and Human Services
Public Health Service
5600 Fishers Lane
Rockville, MD 20857

Hotlines (Drug Information and Referral)

1-800-COCAINE (cocaine hotline)
1-800-662-HELP (NIDA)

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INTERVIEWING & COUNSELING SKILLS

Susan Reynolds, M.S.W. & Patricia Faulkner, M.S., R.D.

PREPARATION FOR INTERVIEWING

Introduction

Pregnancy is a time of expectation and change. Teenage pregnancy represents a period of premature movement from childhood to adulthood and motherhood. At a time when, developmentally, the adolescent female is grappling with her self-concept in relation to the world and her peers, pregnancy presents a period of physical, emotional and social desequilibrium. A budding and precarious style of coping must become durable and flexible to accommodate the constant changes the pregnant adolescent will feel in each area of her life. Ambivalence is one of the most prevalent emotions in teenage pregnancy, and from that any variation of emotion could be possible at any point during the nine months. The biological/hormonal changes of pregnancy only increase the adolescent's volatility and sense of vulnerability.

This chapter discusses the use of interviewing and counseling for providing services to pregnant adolescents. By taking into account the developmental and cultural aspects of adolescence and the unique concerns of pregnancy, interviewing and counseling techniques can be tailored to most effectively work with the young

Table 1
Developmental Issues of Adolescence

Early Adolescence (10-14 Years)
Younger adolescents are least prepared, developmentally, for pregnancy. Consequently, a pregnancy at this age is more developmentally disruptive.

- Egocentric: Normally preoccupied with herself, especially her body's changes - this may become exaggerated in pregnancy
- Emotions and fantasies about sex and pregnancy not well differentiated
- Impulsive: less thoughtful about or purposeful in her behaviors
- More concrete in her thinking:
  - — less able to think abstractly
  - — less able to project herself into the future (even nine months)
  - — less able to consider alternatives and consequences of her actions
- More dependent on parents; less separated and independent.

Middle Adolescence (14-18 Years)

- Fluctuations between regressive/early adolescent attributes and greater maturity
- Psychological needs and social networks in transition
- Need for independence may cause adolescent to resist family support
- Unrealistic fantasies about commitments to boys (who are themselves developmentally immature)
- Social isolation from peers
- Benefit from contact with other pregnant adolescents (in addition to individual support) to encourage personal development, managing emotions, involvement by family

Late Adolescence (18-20 Years)
Pregnancy occurring in late adolescence may be less disruptive of developmental processes.

- Childbearing enhances individuation from parents
- May be motivational in developing appropriate peer relationships (including choosing a mate)

Adapted from Mishne[1] and Bierman, et al[2]

pregnant woman. This chapter includes:

- Preparing for the interview;
- Interviewing objectives;
- Special interviewing techniques;
- Stages of the interview process; and
- Special situations brought by the client or counseling setting.

Developmental Considerations

A pregnancy during adolescence is a dramatic disruption of the adolescent's social and emotional growth in all but the most exceptional cases. Pregnancy is itself a developmental process involving stages over the nine-month period. The unique needs and demands imposed on a woman by pregnancy are in conflict with the age-appropriate developmental needs and tasks of an adolescent. Thus, pregnancy has special implications for each stage of adolescent development.

Cultural Considerations

The culture in which we are raised has a tremendous influence on our attitudes, values, and behaviors. In order for the interviewer to provide sensitive and effective service to clients from cultures different from his/her own, it is critical to:

- Be aware of his/her own cultural values and beliefs, and recognize how they influence his/her attitudes and behaviors;
- Acquire an understanding of the cultural values and beliefs of his/her clients, and how these influence their attitudes and behaviors.

While identifiable differences exist between cultures, it is also important to recognize that:

- Differences may exist within broad cultural groups (e.g., "Asian" includes individuals of Chinese, Japanese, Korean, Southeast Asian, and other cultural affiliations);
- Members of a community or cultural group may or may not share the values and beliefs generally attributed to the group.[3]

Therefore, it is essential to learn about the cultural values and behaviors of specific communities and of individual clients. Understanding client's values and beliefs can more effectively lead to the development of a respectful and therapeutic relationship. Table 2 lists many factors which should be considered to acquire a greater understanding and appreciation of individual and cultural differences.

Self as a Tool

We bring to counseling a great variety of skills, including technical expertise and interpersonal skills. However, less obviously, we also bring values and attitudes (shaped by past experiences) and a range of feelings and emotions. All of these attributes become tools for, or perhaps inadvertently, impediments to, successful counseling. A skilled health professional ought to select those attributes which could serve as tools in the establishment of a therapeutic relationship, and be sensitive to the attributes which may become impediments.

"Adolescent pregnancy" frequently evokes strong feelings and emotions, some which are easy to recognize, others which are not. Intense emotion, discomfort, anxiety or conflict on the part of the health professional might serve as a "flag" that he/she is inappropriately involved or identified with the client. This may occur if the health professional is experiencing intense, unresolved feelings about personal issues similar to those with which the adolescent is struggling.

When a health professional brings to a counseling situation personal feelings or attitudes which he/she transfers or projects onto the client, it is called counter-transference. This can lead to over- or under-identification with a client, and ultimately to inappropriate and unwarranted feelings toward the client, or about her "issues." It interferes with the development of a respectful and therapeutic relationship.

In summary, it is crucial to the success of an interview that the interventions made be developmentally appropriate, culturally sensitive and objective. This requires an examination of interviewer biases so that he or she can effectively and accurately understand the communications and motivations of the client.

INTERVIEW OBJECTIVES

There are three primary objectives to be accomplished in counseling interviews with adolescents:

1. To develop a respectful, therapeutic relationship by providing client dignity
2. To assess the adolescent's needs and develop a plan for meeting those needs
3. To educate

Provide Client Dignity

An individual interview provides a unique opportunity to reach out to the pregnant adolescent and offer her nonjudgmental, supportive concern. It may be the first time she has received individual attention separate from family and friends. This young woman may have ambivalent feelings about this pregnancy and the interviewer can represent a safe, neutral support for her. It is crucial to communicate interest for her as a person. The most important piece to the success of an interview is to recognize the client's dignity, to give her the respect she deserves, and to foster and support the client's taking responsibility for, and control over, her situation (See Table 3).

Table 2
Factors Impacting Attitudes, Beliefs and Behaviors

Family and Social Structures
- family size
- nuclear vs. extended (intergenerational)
- patriarchal vs. matriarchal
- marital structures
- attitudes toward childbirth outside of marriage
- gender roles
- attitudes toward children, adolescents, elderly
- parent-child relationships
- community cooperation vs. individual responsibility
- attitudes about mothering

Religious Beliefs
- influence on lifestyle (e.g., dietary restrictions, use of medications)
- influence on attitudes about health and illness
- belief in magic, supernatural, spirits
- openness regarding religious beliefs/practices

Communication Style

Non-Verbal
- attitudes about touching strangers (e.g., shaking hands, touching ones shoulder) - may be gender or age sensitive
- attitudes about pointing at people or things
- personal body space (can vary from 6" - 3 feet)
- eye contact (length of contact may be dependent on age, gender, and whether one is listening or speaking)
- silence (length varies considerably)
- attitudes about emotional expression vs. restraint; formality vs. informality

Verbal
- attitudes about verbal aggressiveness vs. self-depreciation
- facility with second language
- ability to read native and second language

Health Beliefs
- health "consciousness"
- sense of personal efficacy
- attitudes about mental health
- attitudes about "western" vs. traditional or folk medicine/healing
- attitudes about pregnancy (and need for health services)
- beliefs about causes of physical/mental illnesses (stress, diet, personal responsibility)
- attitudes about seeking professional help

Sexual Attitudes and Practices
- attitudes about adolescent and/or premarital sexual activity
- attitudes about birth control
- attitudes about modesty
- attitudes about sexuality

Perceptions of Time
- past, present, or future time oriented (influenced by cultural affiliation and level of cognitive development)
- attitudes about punctuality (time-urgency)

Dietary Practices
- symbolic meanings of foods
- religious restrictions
- cultural/personal food preferences
- attitudes about food cravings (e.g., meanings attributed to craving) and pica
- attitudes about weight gain
- attitudes about baby's birth weight
- attitudes about breast vs. bottle-feeding; introduction of solid foods

Adapted from USDA, Department of Health and Human Services[4]

Collecting Information, Assessment, and Developing Plan

The second objective of interviewing is to gather information so that an assessment can be made and a plan developed. By allowing her a sense of control and partnership in the interview/counseling process, the interviewer can ensure a more accurate assessment and workable plan.

Collecting Information

The objective of collecting information is to learn about the adolescent:

- her immediate agenda for the interview
- her emotional and dietary needs
- her level of cognitive development measured by how she responds to inquiries (e.g., concrete vs. abstract, present vs. future time orientation)
- her coping strategies
- her learning style

This is accomplished by utilizing interview techniques which facilitate the adolescent's sharing of information (see next section of this chapter) and by observing both the content and the verbal and non-verbal affect expressed.

Assessment (from the Latin word for "to sit beside")

Upon collection of information, the interviewer needs

Table 3
Strategies for Fostering Client Dignity

- Address the client's presenting agenda.
- Provide information so that a structure can be developed that will encourage and support an honest, mutual interaction.
- Assess and respect the client's coping style. (e.g. What is her behavior telling you? Is she withdrawn? Talkative? A caretaker? Childlike? Mature beyond her years?)
- Allow the client choices whenever possible so that she can feel she is making her own decisions.
- Normalize variations in feeling and mood so that the client does not fear or harshly judge the changes in her emotions since pregnancy.
- Provide words for feelings.
- Provide education about physical and emotional aspects of pregnancy so that the client has a simple base of knowledge from which to participate in her pregnancy.
- Reinforce adult (not childlike) behaviors.
- Focus on her positive attributes to foster self-esteem and positive coping.
- Draw out positive coping by recognizing and complimenting coping behaviors that are obviously functional and healthy.
- Focus away from pathology and avoid unhelpful commiseration so that you will represent a person who can remain a neutral mirror for her.
- Proceed at a pace that is comfortable for the client.

to consider each piece of information and evaluate its function in either meeting or interfering with the adolescent's needs being met. Once the interviewer has arrived at an assessment, it should be shared with the client to allow her to respond, clarify or discount it. This will allow the interviewer to assess the client's interest in herself, her care, and the cooperative establishment of a workable plan.

Developing a Plan

This also requires the active involvement of the adolescent in deciding and prioritizing what elements of her "environment" (cognitive, social, and physical) she wants to enhance or alter, and to develop strategies for doing so in order to reach her goals.

Education

The third objective of counseling is education. Health professionals counseling pregnant adolescents can teach the young woman about:

- the process of pregnancy, including the developmental changes she and her baby are going through
- her special nutritional needs and those of her unborn and newborn baby
- parenting

Less obvious, but perhaps more profound, is the opportunity to facilitate self-discovery by the adolescent of her feelings, desires, concerns, and attributes. As this occurs, it is important that the health professional provide reassurance that the adolescent's feelings are normal, that her concerns are important, and that her questions are worthwhile.

Much of the education will be indirect and be accomplished through the process of gathering information, reviewing the assessment, and developing the plan. Alternatively, some of it will be more didactic. The approaches used should be developmentally appropriate and not remind the adolescent of school.

INTERVIEW TECHNIQUES

In order to facilitate the best transfer of information from the client to the interviewer, the interviewer needs to create an atmosphere of support and reassurance. The interviewer should avoid judgmental attitudes and language. During the session the client is the teacher, providing information about her life, her needs, her motivations, and her ability to achieve a workable plan for a smooth pregnancy. As the clinical psychologist, Dr. Pascal says, "We hear what that patient says, how she says it, and how she behaves when she says it."[5] Listed below are techniques which can facilitate this process.

1. **Attending:** Paying full attention to the client's communication, both verbal and non-verbal. Behaviors which appear to be contradictory are particularly telling, and need to be explored.
2. **Behavioral questions vs. attitudinal:** Pascal has developed a helpful interview technique that assists in soliciting pertinent information about the patient in a nonthreatening manner.[5] Ask for behavioral incidents so that enough information is gathered to make an assessment of the client's situation. Do not settle for the client's assessment or attitude about a

situation or feeling. The interviewer needs to hear the client's perception, but also needs to gather enough information to assess the accuracy of that perception. For example:

Attitudinal: "How has your best friend responded to you being pregnant?"

Behavioral: "When was the last time you saw your best friend?" What did you do together? What does she say when she talks to you about your pregnancy?"

With the latter series of questions, the interviewer can gather sufficient information to assess the support offered by the friendship. It is possible that more truthful information can be gathered with focused, behavioral questions than with global, attitudinal questions that encourage the socially-appropriate responses.

3. **Open-Ended Questions:** In order to encourage as much free communication by the client as possible, open-ended questions should be used rather than close-ended. A helpful hint is to begin questions with the words: What, When, Where, Why and How rather than words such as: Will, Do, Does, Would, and Have. While the former series encourages elaboration, the latter series elicits yes/no responses.

4. **Encouraging Responses:** Subtle indicators to the client that the listener is paying attention; intended to encourage the adolescent to continue. For example, "Oh?"; "Then?"; "Tell me more"; "Uh-huh"; repetition of one or two key words, or a simple restatement of client's last words; head nods, facial expressions, posturing and gesturing.

5. **Non-Verbal Communications:**

   Silence: Allows the client time to respond emotionally and then verbally. Allows an opportunity for spontaneous speech by the client that may redirect the interview to topics most germane to the client.

   Eye Contact: Eye contact can be an effective tool for showing respect and concern for the adolescent, and for encouraging further disclosure. Being sensitive to the adolescent's comfort level and coping style, the interviewer can gauge the appropriate use and length of uninterrupted contact.

6. **Normalization:** Reassuring and educating statements. "Many pregnant women feel less control over their emotions. That can be a normal result of the changes in your body and hormones."

7. **Balance Statements:** Offering the spectrum of emotion or circumstance in a nonjudgmental manner allows the client to select the piece most relevant for her. For example: "For some women, pregnancy is wonderful and something they were really ready for. For other women, it can understandably be a scary time when they feel very uncertain about the changes they are experiencing. I'm wondering what sounds familiar to you?" The interviewer, in effect, provides some normalization and education so that the client can identify her internal feelings and match them with the words that have been provided for her. These statements can be very useful to adolescents as they may be less likely to verbalize, and more likely to act out, difficult emotions.

8. **Clarification:** Asking the adolescent to clarify her statement or feeling which was unclear to the interviewer (e.g., "So, do you eat breakfast three times/week or five?")

9. **Paraphrase:** A restatement or rephrasing of the content of the adolescent's message in the interviewer's own words, with the intent to clarify or convey understanding of what was said. (e.g., "It sounds like one of the reasons you are not eating regularly is that you don't have enough money for food.")

10. **Providing Words for Feelings:** Rephrasing the affective part of the client's message by giving words to feelings. The intent is to identify and clarify how the adolescent feels, convey empathic understanding, and encourage expression of other feelings. Encourage ventilation of emotion through words rather than behaviors (e.g., Upon observing hostility, "It can make some people really angry to talk to someone about their diet. I'm wondering how you are feeling.").

11. **Empathy vs. Sympathy:** The distinction between empathy and sympathy is subtle and the feelings are frequently confused.

    Sympathy for a client occurs when the health professional over-identifies with the client, "taking on" and feeling what the client feels. It represents an over-involvement in the client's issues, and consequently, a loss of oneself.

    Empathy, on the other hand, represents a healthy involvement with the client, enabling the health professional to "tune into" the adolescent's experience and state of mind. In doing so, the health professional can appreciate how the client feels without giving up his/her own identity.

12. **Assess Understanding:** The interviewer can periodically check the client's comprehension of information shared with her, and the interviewer can thereby assess the client's perception of all that has transpired.

13. **Summarization:** To recapitulate, to condense, and to clarify the essence of what has been said; a re-

statement of key points. This might serve as an opportunity to repeat the plan and any recommendations.

THE INTERVIEW

Introductions

The initial stages of the interview are crucial for setting the tone and structure of the therapeutic relationship.[5] It is easy to minimize the importance of the first moments of an interview. Though it is a time of movement and action, valuable information is exchanged between the client and the practitioner. There are some important considerations for the interviewer when setting up a respectful, comfortable interaction for the client.

1. **Dress:** How the interviewer dresses communicates to the client how the former feels about the latter. It is important to wear something that conveys respect for oneself as a professional and for the client.
2. **Consultation Room:** Adolescents may feel relaxed in a setting that is informal (avoid exam rooms if possible; choose comfortable chairs, colorful walls, posters and plants). It can be difficult to find privacy for interviewing in a busy obstetrical clinic. It can also be difficult for an adolescent client to feel comfortable sitting alone with a stranger for an interview. The goal is to help her feel as at ease and respected as possible. The identification of a private interviewing room prior to the interview indicates to the client the medical team's respect for this interview in the provision of her care. Privacy is crucial in that the interviewer is asking for personal information and disclosure from the client. Frequent interruptions convey lack of respect for the client. A private setting is more conducive to the development of a trusting, honest interaction.
3. **Greeting:** The manner in which the client is called from the waiting area can set the tone for the session. If her name is called out by the receptionist, and she is directed to the consultation room by a third party, a tone of formal, institutional interview may be set. With adolescents, it may be particularly helpful to offer a warmer, softer interaction. If possible, the interviewer should greet the client in the waiting room and invite her to the interviewing room. The interviewer should give his/her name and title upon greeting the client to ensure that the client understands with whom, and where, she is going.

Beginning the Interview

1. **Seating:** The client should be allowed to choose a chair instead of being directed to one by the interviewer. This offers the client an opportunity for control and choice, and provides the interviewer with valuable nonverbal information. If the client chooses the chair in the farthest corner of the room, it might indicate a negative response (fear, apprehension, shyness) to a private interview. It is acceptable to verbally acknowledge and normalize the client's discomfort while also asking permission to draw up a chair close to her (e.g., "Some people enjoy having the opportunity to meet individually to talk about their diet, and others can feel uncomfortable or nervous about it. I will try to make this as easy as possible. How would you feel if I draw my chair up a bit closer so that you can hear me when I speak?") Avoid obstructions between the interviewer and client such as a table or a desk.
2. **Introductions:** The interviewer should repeat the client's name as previously identified, but also inquire about another name by which she may prefer to be called. The interviewer's name and title should be repeated, and an inquiry made regarding the client's familiarity with the role of the interviewer (as nutritionist, for example). This provides the interviewer an opportunity to assess the client's prior biases, preconceptions and expectations regarding the interview. By describing the nutritionist's role in the clinic, his/her relationship to the team, and the role of nutrition in the care of her and her unborn baby, the client receives significant information for beginning a rapport that is based on accurate information and mutual understanding.
   - Define the interviewer's role in the clinic and with the medical team.
   - Describe the role of nutrition in her care and that of her unborn baby.
   - Normalize her feelings by sharing experiences of other young pregnant women. ("I've talked with many young mothers and have found that some really enjoy talking to someone about the changes they see in their bodies, their weight, and eating habits. Others don't like it as much, and feel that they can manage on their own. You can let me know how I can be most helpful to you as we talk today.")
   - Clarify the tasks to be accomplished together and the time period of the interview.

   By briefly providing this overview the client receives the information she needs to feel a sense of control over her interaction with the interviewer (nutritionist). There are no surprises and she is allowed the dignity and respect to make her own informed decision to participate or not.
3. **Setting the Rules:** It is important to give the client a role in establishing rules. The interviewer needs to be very clear with her about situations in which the rules will be broken.

- Clarify how her meetings with you will be different than with the other members on the team (i.e. she won't have to undress, have blood drawn).
- Discuss confidentiality: Define it together. Identify with whom the information will be shared, under what circumstances, and why. Establish rules for sharing that information: "I will talk with you first about my decision to share certain information with the people we have identified together." The following issues indicate a reason to break confidentiality: danger to self, danger to others, and child welfare issues.

4. **Visit schedule:** If these interviews will occur on a regular basis, discuss this and who might periodically be included (e.g., parents, nurses, doctors).

Middle Phase

Now the second stage of the interview has begun. We recommend utilizing the SOAP model of gathering information: Subjective data, Objective data, Assessment, Plan. This allows a framework for gathering and organizing information throughout the interview. (For further in-depth discussion, please see Chapter 14).

Termination/closure ritual:

Always give the the patient a 10 minute warning before closing the interview. That will allow her the opportunity to provide any other information she feels is necessary prior to closing. It will also enable her to reestablish her boundaries before returning to the waiting room and the rest of the medical team. It can be disconcerting for the client to have a session end abruptly.

In ending the interview, also leave time to allow the client to tell the interviewer what was helpful and unhelpful in the session and to review the work for next session. If this pattern is followed every session, it can serve as a comforting ritual of "tying up loose ends" or "closure" for the adolescent client. The client can gradually come to anticipate this opportunity for critique and review. It can also be used as a barometer regarding her involvement in her pregnancy care.

SPECIAL ISSUES

The Difficult or Hard to Reach Adolescent

There are clients who are, for many varied reasons, resistant to meeting and talking with an interviewer or receiving assistance. Spending time discussing favorite hobbies and interests can be helpful in beginning a relationship with all adolescents. However, this may not be sufficient to reach the resistant client. The need to allow the hard-to-reach adolescent a feeling of self-control is essential. She is often trying to establish mastery over an anxiety-producing situation and utilizes coping styles that allow her to avoid interaction with the stressful stimuli. The interviewer's clue to the nonverbal client will come from reading the client's behavior.

Behaviors you may see	*Feelings to consider*
Aggression Hostility Withdrawal Overly talkative Manipulative Non-compliant Overly agreeable	She is angry for your intrusion; fearful about meeting alone with you; exhausted by the demands of pregnancy; overwhelmed by the many people she must meet and respond to at the obstetrical clinic; feels ashamed or fearful about the pregnancy; anxious about family or social support issues outside the clinic.

It is possible that the client may not have a handle on her emotions and may feel only confusion or anger. The interviewer can gently comment on the client's coping style so that she is aware that the interviewer sees, hears and understands her.

Table 4
Strategies for Working with a Hard-to-Reach Adolescent

Goal: To reduce the level of stress experienced by the hard-to-reach client:

- read her behavior as her language.
- complete your introductions as stated earlier.
- respect her coping and provide, gently, words for her behavior so she can link her feelings to the more effective coping mode of verbalizing feelings in a safe environment.
- proceed at a pace that is comfortable for her.
- offer her understanding where she does not understand herself.
- normalize and verbalize feelings by providing balance statements for her to think about.
- recognize her continued resistance and proceed very simply and gently with the information that you feel is essential that she have.

Table 5
Objective Key Indicators/Red Flags in Need of Further Attention

Dress	dirty, soiled clothing vs. clean, well-kempt clothing
Body size	significantly overweight or underweight
Psychomotor	body language
Verbal Behavior	pitch, loudness, speed, stutter, slurring speech
Verbal Content	disjointed, whether it makes sense or not
Affective Display	whether affect is appropriate to content, flattened, heightened
Situational Factors	lack of housing, substance abuse, financial and food resources

Adapted from Bolton[6]

Areas for Further Referrals

Each member of the health care team is always responsible for being aware of signals from patients that are indicators for difficulty and stress. Although the team psychologist or social worker is often responsible for probing into the emotional, social and environmental aspects of a patient's life, the benefit of an inter-disciplinary team is that it allows the client choice in identifying with whom she feels most at ease for revealing troubling thoughts and difficult circumstances. The nutritionist is also in a unique position because eating habits are often a barometer of emotional status. Therefore, throughout the interview, it is crucial for the nutritionist to look for

Table 6
Areas of Vulnerability

Psychological:
- negative feelings about being pregnant
- history of mental health treatment
- self-concept confusion since the pregnancy
- fears about the changes she has already begun to experience in her life
- confusion over hormonally-induced mood swings
- hostile or angry feelings toward her unborn baby
- ineffective coping mechanisms (e.g., substance abuse, eating disorders...)

Parenting skills:
- little future orientation
- lack of realistic planning for the baby (clothes, baby items, childcare)
- newborn may be perceived as a novelty, rather than a person

Financial:
- unconnected to the social welfare system for insurance and welfare payments
- emancipation from her parents
- inadequate or lack of housing

Social Support:
- adjusting family and social supports
- isolation from her friends since she became pregnant
- family disapproval or shame regarding her pregnancy
- pressure from family to place infant for adoption
- pressure from family to keep infant
- no access to other pregnant teenagers
- lack of attendance for prenatal care appointments

Nutrition:
- distorted body image; anxiety about body shape changes
- noncompliance with nutritional program
- inadequate or excessive weight gain

Adapted from Bolton[6]

subjective and objective information that would indicate a need for further assistance (see Table 5).

A pregnant teenager may be particularly vulnerable in the areas listed in Table 6.

Counseling in an Undesirable Setting

Many clinics suffer from inadequate resources (e.g., staff, time, and space) and, consequently, may be dreary, crowded, noisy, small, and chaotic. This is particularly unfortunate because it may inadvertently send a message to the adolescent that nutrition counseling is not very important and, especially tragic, that the adolescent and her concerns are not very important.

Table 7
Adaptations to Counseling in Undesirable Settings

- verbally acknowledge and apologize for the inconvenience, reassuring the adolescent of your concern for her.
- reschedule the appointment if conditions might be better another day.
- acknowledge your own feeling of anger, frustration, anxiety or tension elicited by the situation, and be aware that the adolescent may feel similarly.
- consider going for a walk or sitting outside to conduct the counseling session.
- when time is inadequate, prepare in advance and prioritize needs:
  — review the chart and previous "progress notes" (if available) prior to meeting.
  — have available at the meeting any materials that might be useful.
  — if there are no immediate or obvious needs, allow her to use the time as she wants (e.g., ask if she has any particular questions or concerns that she'd like to discuss).
- if permissible, display in the lobby or exam room posters which might be appealing and informative to pregnant adolescents.

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14

STRATEGIES FOR DIETARY CHANGE

Patricia L. Faulkner, M.S., R.D.

Pregnancy puts an adolescent at increased nutritional risk not only because of her tremendous nutrient needs, but also because of the stage of psychosocial development and the lifestyle characteristics of adolescence, both of which influence eating behaviors. Thus, to be effective, prenatal nutrition counseling must address directly the adolescent's physical and emotional needs, her concerns, and her capacity to implement change.

When working with adolescents, certain interviewing and counseling techniques will facilitate the development of a healthy, productive and therapeutic relationship (see Chapter 13). Within the context of such a relationship, deliberate strategies should be employed to aid the adolescent in making desirable dietary and behavioral changes by increasing her motivation and by providing her with the necessary skills to implement positive behavior change.

A MODEL FOR CHANGE

The primary objective of nutrition counseling is to enable the adolescent to make the desired dietary and behavioral changes for improving her nutrition status and well-being during her pregnancy. This can be accomplished in more than one way. The models presented below are two possibilities, both of which can be utilized.[1]

The first model predicts that behavior change results from an increase in knowledge. The second predicts that behaviors change in response to changes in the environment, which includes the physical environment (e.g., food available, restaurants patronized, media messages, financial resources, etc.), the social environment (e.g., influences of family, friends, peers, etc.), and the cognitive environment (defined as an individual's thoughts and emotions).

If we accept that both models predict behavior change, we can infer from them our role as facilitators of dietary change. We must be prepared to teach nutrition concepts

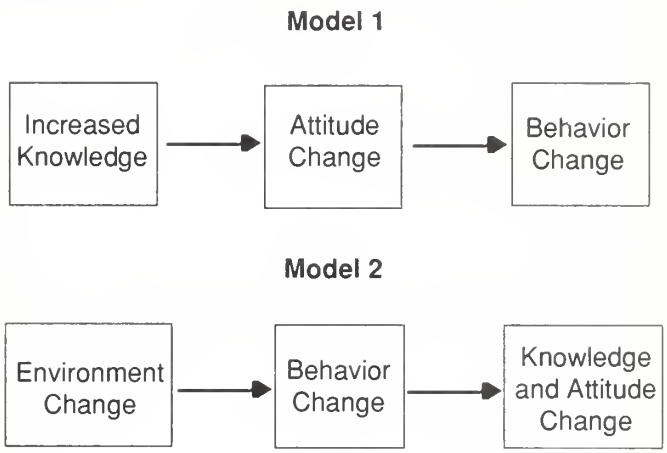

Table 1
Examples of Learning Objectives

Nutrition Concepts	Skills
• Nutrient requirements for pregnant adolescents	• Reading package labels
• Food sources of major nutrients	• Comparing two foods for nutrition quality
• Health risks associated with: -inadequate intake of particular nutrients -excessive intake of particularnutrients	• Identifying discrepancies between own diet and diet recommendations
• Role of exercise in weight control	• Different methods of food preparation
	• Resisting peer pressure

and to provide the adolescent with the necessary skills both to identify components in her environment which promote an unhealthy diet, and to change those environmental factors so that they support the desired dietary change. Examples are given in Table 1.

A GENERAL GUIDE TO TEACHING

One of the important roles for the health professional responsible for nutrition counseling is teaching. Some of the time will be spent presenting nutrition information; more of the time will be spent teaching the adolescent skills essential for enabling her to change her dietary habits. The approaches are the same and should be considered before counseling begins.

- Consider what the adolescent is ready for and needs to know. The adolescent's nutrition knowledge, skills, and the circumstances influencing her behavior should be apparent from the initial nutrition assessment. Adapt your teaching and counseling strategies accordingly.
- Know well the information and materials you intend to present. Be prepared, accurate, and consistent. (It is equally important that the information you present be consistent with what other health care providers on the team are telling the adolescent. Inconsistencies cause confusion and distrust.)
- Teach only what is necessary, including what the adolescent needs to know and whatever she may want to know. For an adolescent to increase her consumption of iron, she needs to know what foods are rich in iron and how to incorporate those foods into her diet. She does not need to know about iron absorption. In most cases, it would be sufficient to provide her with a list of foods which are good sources of iron. Some adolescents may be particularly curious or interested and want more information, which should then be provided.
- Be clear and specific when giving instructions, explanations, or stating your expectations. Speak plainly and simply.
- Use examples and analogies which are relevant to the adolescent as a means of clarifying an idea.
- Occasionally check the adolescent's understanding. You may ask her to summarize what she understands you to have said.
- Encourage questions and answer them as they arise.
- Don't hesitate to say that you don't know the answer to a question. Offer to get the information and then be certain to follow through.
- Involve the adolescent. Counseling should be an interactive process, not didactic in structure. Encourage her active participation and allow her to take the lead when appropriate.
- Be committed to counseling each adolescent you see. Show enthusiasm. Show genuine respect and concern for each client.

VARIOUS TECHNIQUES FOR TEACHING

People learn in different ways. Generally, the more involved and active their participation, the more they will derive from the "lesson." Furthermore, by using different approaches or techniques to teach a particular concept or skill, you are able to reinforce a point while providing variety and interest.

Table 2 provides a list of ideas which could be used for teaching and counseling adolescents.

A PROCESS FOR CHANGE

After completing a thorough nutrition assessment and collaborating with other members of the health care team, the health care provider can identify the nutrition concerns which will be targeted for change. When this has been done, strategies for implementing change can begin.

There is no single strategy which is guaranteed to be effective and successful. Any strategy should be adapted and individualized to accommodate the particular needs of a client. A general approach is outlined below.[1,2]

- Describe to the adolescent the primary objective for nutrition counseling during her pregnancy, i.e., to enable her to choose appropriate amounts of good-tasting and nutritious foods so that she can be healthy and feel good throughout her pregnancy, and so that her baby gets all of the nutrients needed to be healthy.
- Based on the nutrition assessment, identify specific dietary factors and eating behaviors which might be targeted for change. By reviewing with the adolescent her usual food intake and comparing it to the recommended food intake for pregnant adolescents, the client can participate in identifying areas in her diet which need to be changed.
- Prioritize the identified areas according to the relative health risk to the adolescent and her baby, and select one area or problem which will become the initial target for change. The adolescent should be encouraged to choose, but should be guided by the counselor to consider both the behavior change which might have the greatest impact on her health or comfort and her chances for successfully changing the behavior. Initially, it is probably more important to maximize her successes. At subsequent prenatal visits, this list should be re-evaluated and revised as the adolescent adopts new behaviors and her needs change.
- Explore with the adolescent the circumstances and reasons for having adopted and maintained the target

Table 2
Teaching Aids

Pictures/posters in clinic offices or waiting rooms of
- pregnant adolescents and young mothers with babies
- varieties of nutritious foods and snacks
- foods grouped by major nutrients (e.g., calcium, protein, vitamins A and C, iron, fiber) particularly including foods generally liked by teenagers
- public health notices warning against alcohol, tobacco and drug use during pregnancy

Food samples and recipes
- if feasible, provide a nutritious snack during prenatal clinic
- offer recipe cards for inexpensive, nutritious snacks and foods
- prepare and provide recipes using WIC and commodity foods (check local WIC offices for recipes or cookbooks)

Printed materials
- lists of nutritious snacks
- a list of nutritious, energy-rich foods for promoting weight gain
- a list of nutritious, low-energy foods for controlling weight gain
- lists of foods rich in iron, calcium, vitamins A or C, or fiber
- information regarding nausea, heartburn and constipation, with safe, non-pharmacological (e.g., dietary) treatments
- an illustration showing the distribution of weight gain during pregnancy
- weight-gain grids for monitoring each client's weight
- food record forms
- food packaging labels
- contracts for behavior change

Other aids
- food models
- anatomical models showing stages of fetal development
- test tubes showing the sugar or fat content (in teaspoons) of various foods (especially fast foods and soft drinks)
- filmstrips, slides and videos

behavior. For example, an adolescent whose energy intake is inadequate may claim to have too little to eat. It is important for the adolescent to understand the precipitating conditions which motivate her so that those conditions can be changed.

- Set goals which serve as a stepwise change toward eliminating the identified problem by altering some of the environmental conditions perpetuating the behavior. There are a number of factors to consider when setting goals which will make it more likely that the adolescent can achieve and maintain them. The goals should be:
  - Manageable. Begin slowly with a small number of short-term goals, perhaps one or two, to be worked on between prenatal visits.
  - Realistic. The adolescent should set goals which are attainable. The new behaviors should be ones which accommodate the adolescent's food preferences, time constraints, and resources. As such, they can be integrated into her lifestyle rather than necessitate major lifestyle changes.
  - Specific and measurable. When the adolescent leaves the office, she should go away knowing exactly what she is going to try and how many times.
  - Flexible. When the adolescent is setting goals, caution her against setting goals which are too rigid, extreme, or absolute (e.g., "I plan to eliminate all snacks this week" or "I will exercise every day"). Such goals are likely to lead to failure and disappointment.

    A goal may turn out to be more difficult or challenging than anticipated. The adolescent should feel comfortable modifying the goal herself, or in asking you for help. It is critical that the adolescent not become too discouraged by her inability to achieve a particular goal.
  - Successively more challenging. In initial counseling sessions, help the adolescent set goals she is likely to achieve. Having experienced success early, she may be more confident and motivated, and better skilled to take on more difficult and complex dietary changes later.

Table 3
Process for Changing Behaviors

Process	Examples
Nutrition assessment	See Chapter 7
Identify and prioritize Dietary needs	1. Inadequate energy and nutrient intake 2. Low intake of calcium-rich foods 3. Excessive intake of caffeine
Select one area and identify behaviors which contribute to the problem	Inadequate energy and nutrient intake 1. Skipping breakfast ("too little time") 2. Forgetting to take prenatal vitamin ("I just never think about it")
Set one or two goals	1. Eat breakfast 3 out of 5 school mornings 2. Take prenatal vitamin 4 days this coming week
Brainstorm for ways to accomplish each goal	**Breakfast** •Set alarm and get up 15 minutes earlier •Get out school clothes the night before •Purchase or prepare foods ahead of time that can be eaten while dressing or taken along on the way to school (e.g., fruit, muffins, individual yogurt or juices) **Prenatal Vitamin** •Put vitamins in a more visible place (e.g., with keys, toothbrush, or make-up) •Write reminders and stick them around the house •Ask someone at home (e.g., mother, boyfriend, or roommate) for a reminder
Implement the plan	The adolescent agrees (or perhaps contracts) to try the ideas before the next clinic visit
Evaluate the plan	Discuss what worked and what didn't, and why — if necessary, brainstorm again or revise the plan
Maintain desirable, new behaviors Set new goals	The adolescent continues "practicing" the acquired behaviors 1. Eat breakfast (each morning) before school 2. Take prenatal vitamin 7 days this week

- Once one or two goals have been set, brainstorm. The purpose is to come up with as many ideas as possible for reaching the goal. She needs to see ways around obstacles rather than to continue justifying a behavior because of obstacles.
- Evaluate the plan. Discuss what worked and what didn't. If an idea didn't work, explore the reasons why it didn't. If necessary, continue doing more brainstorming to find other alternatives she could try. Revise the plan and goal if necessary.
- When the goal is achieved, maintain the behavior. It is important to reinforce the idea that each step or individual goal is intended to move the adolescent closer to the overall objective of developing eating habits which are more healthful. If goals are set by the adolescent, practiced and achieved, the new behaviors might eventually become integrated into her daily routine.
- Begin to work on establishing new goals for changing behaviors.

These steps are summarized, with examples, in Table 3.

MOTIVATING BEHAVIOR CHANGE

It is extremely difficult to change behavior, particularly in a way which is lasting. Therefore, merely asking adolescents about their motivation and the things they value may give a very inaccurate or incomplete picture of why they act (or fail to act) in a particular way. For example, their smoking behavior may be inconsistent with what they report to be of high value such as their health or their baby's health. They may be more responsive to forces such as peer pressure that they do not identify. Probe to determine the forces to which the adolescent is most responsive.

One goal as a health professional may be to initiate "trial behavior" in your client; a behavior that is undertaken, perhaps for the first time, as an experiment. It can be thought of as exploratory behavior. If you can identify the factors or forces to which the adolescent responds, you can use these as contingencies to encourage the adolescent to do something, at least on a trial basis. If the experience is positive enough, it may become self-reinforcing and long-lasting.

To initiate trial behavior:

- Link the behavior with its consequences. Make the consequences apparent: the negative consequence of the unhealthy/undesirable behavior, and the positive consequences of the healthy/desirable behavior.
- Be non-judgmental, open-minded, and observant. "Listen" carefully to the adolescent to learn what she values, what her concerns are, and what needs she seeks to meet.
- Acknowledge those concerns and frame behavior change objectives in terms of those concerns and needs.
- Present contingencies that are:
  - Immediate
  - Concrete and tangible
  - Valued by the adolescent

Rewards can be an effective means of motivating behavior change. Assess for each client the potential of rewarding positive behaviors on influencing change. Discuss with the adolescent what tangible rewards would be most meaningful to her.

Suggestions For Maintaining Interest And Commitment

- Present information and materials in a variety of ways (see Table 2).
- Engage the adolescent in action-oriented exercises:
  - Keeping food and activity records
    * Keep them simple and easy to complete.
    * Keep the record-keeping period relatively short (e.g., about three days).
    * Specify which behaviors are to be monitored.
    * Encourage the adolescent to be honest and accurate so that the records can be used effectively for measuring change and identifying problems.
    * Always review the records together to convey the importance of the activity and to use it more effectively.
  - Contracts
    * Serve as reminder to the adolescent of her behavioral goals or objectives.
    * Instill a sense of responsibility and commitment to trying out new behaviors.
    * Reinforce the problem-solving skills learned during the counseling session.
    * Make something which may be abstract more concrete.
  - Modeling: demonstrating a skill or behavior
    * Provides an opportunity to observe a behavior and its consequences (e.g., ordering skim milk at a fast food restaurant might elicit a response from friends) which may reinforce or discourage the behavior.
    * May reduce the anxiety of the adolescent who intends to try the same skill or behavior outside of counseling.
    * Can be used to demonstrate how to analyze food records, read a package label, or handle uncooperative friends.
  - Role-playing provides an opportunity for the adolescent to practice a behavior or skill in a safe, nonthreatening, supportive setting, and to experience "roles" other than her own (provides an excellent opportunity to practice resisting peer, media, and family pressures):
    * Explain the rationale.
    * Specify, in concrete terms, the critical behaviors of the skill.
    * Model the behaviors.
    * Have the adolescent (or individuals in a group) role-play.
    * Discuss the actors' enactment of the behaviors.
    * Repeat the process, switching roles.
  - Experimenting with foods
    * Try new foods (e.g., compare whole, 2%, 1%, and skim milk).
    * Compare two recipes: one prepared traditionally, one prepared with healthy modifications.
    * Provide an opportunity to practice food preparation skills.
    * Examine menus from local restaurants.
- Encourage the adolescent to involve her partner, friends, and family in her attempts to change her diet.
  - Have the adolescent identify who might be most/least supportive.
  - Discuss what roles she would like others to play in her attempts to make changes.
  - Discuss (and perhaps role-play) how she can request people's support and effectively communicate her specific needs to them.
  - Consider including various individuals in some of the counseling sessions (this can be particularly important if she lives at home and her mother buys and prepares most of the food, or if she lives with her partner).
- Provide continuity of care
  - Stay in contact between sessions (e.g., by phone or mail) to provide continual support when the most difficult part of behavior change is taking place.

- Encourage the adolescent to call you with questions or concerns when they arise rather than requiring her to wait until your next session.
- Be aware of other care the adolescent is receiving. It is critical to collaborate with the other members of her health care team.
- Provide her with information about other resources in the community that might particularly benefit her (e.g., mental health facilities, public assistance, WIC, commodity food programs, support groups) and link her to those resources.
- Be diligent and conscientious in regard to "follow-up" care. Review progress notes from previous sessions. Find answers to questions not answered previously. Collect any materials she requested or that you anticipate needing.

• Be supportive. It is your support, encouragement, and care that will keep the adolescent coming back.

THE INITIAL COUNSELING SESSION

The first meeting you have with the adolescent is especially important because it sets the stage for what may or may not happen at future sessions. She will develop an impression of you as a person and a professional which will likely affect the counseling relationship.

The following is a general outline for the initial counseling session.

• Make the client feel comfortable. Ideally, counseling should be conducted in a quiet, private room in which the atmosphere is pleasant.

• Engage her by spending a few minutes to find out something about her and by telling her something about yourself.

• Explain the importance of her eating habits to her pregnancy (e.g., that healthy eating habits can optimize her chances of having a healthy baby and of her being healthy and comfortable through her pregnancy).

• Briefly describe your approach to changing eating patterns and food choices.
  - Explain that each person's eating habits are complex and that changing any habits takes time, planning, and practice in order for those changes to last.
  - Describe the components of counseling that you will use, including:
    * A thorough nutrition assessment comprised of a medical, social, and diet history so that you can identify the assets of her current diet and any areas that need improvement.
    * Twenty-four hour food recalls, and possibly food records, to see what her current eating patterns are.
    * Setting short-term goals as step-by-step changes toward achieving longer-term established goals.
    * Looking together at what she eats and what influences her eating behaviors.
    * Coming up with strategies she can implement to change the environment so that it influences her behaviors in a positive way.
    * Problem-solving.
  - Explain to her what you consider your role to be:
    * To provide information.
    * To offer support.
    * To facilitate her attempts to change behaviors.
    * To guide her through the problem-solving process.
  - Explain to her what you expect from her:
    * That she accept responsibility for her behaviors so that she can begin to believe that she can choose to replace healthy behaviors for less healthy behaviors.
    * That she be an active participant in the counseling process.

SUBSEQUENT COUNSELING SESSIONS

Following a somewhat structured format for subsequent counseling sessions may increase your efficiency and your ability to "keep on track." Still, as in all counseling, you need to be flexible and willing to adapt your plans if the adolescent has more pressing needs than what you had planned.

• Prior to seeing the adolescent, review your progress notes from the previous session. If necessary, check any current lab results and her weight.

• Allow for a few minutes of informal conversation when you are first together. This brief interaction helps personalize her time with you and is a good opportunity to ask if she has had any particular concerns or questions since the last visit.

• Review with her the relevant lab results and her current weight. Plot her weight on her weight-gain grid. If necessary, review the expected weight gain during pregnancy keeping in mind her prepregnancy weight (see Chapter 8). A 24-hour food recall may be useful, at this point, as an instructional tool for discussing weight gain which is either inadequate or excessive.

• Review with her the previous session, including any "homework" or goals she was going to work on between visits. Provide feedback to her on what she accomplished and on what she had been unable to accomplish. If warranted, continue problem-solving to come up with alternatives for working toward her goals.

- When appropriate, work together to establish new goals and a plan for the period between sessions. These behavioral objectives should be written out by the adolescent and a copy made for your records.
- Before ending the session, ask the adolescent if she has any last questions or concerns before leaving. This provides a good opportunity to clarify any confusion or misunderstandings.
- After the counseling session, chart progress notes while the circumstances of the particular case are fresh in your mind.

Occasionally, an adolescent will bring up important concerns or issues which are outside of the "realm" of nutrition counseling (e.g., physical abuse, family psychosocial issues, decisions about parenting). These should not be dismissed or minimized, and yet might best be handled by other professionals. After acknowledging the importance of her concern, ask if she would like to speak with whomever the appropriate staff would be. Depending on the urgency, it may be appropriate to terminate the current counseling session and immediately refer her to that staff person. If that is not necessary or possible, you might contact the person, convey the adolescent's concerns and set up an appointment for her, being sure to give her the name and phone number of the person with whom she will meet. Depending on the seriousness and, again, the adolescent's urgency, a follow-up phone call to the adolescent may be warranted between sessions.

ALTERNATIVE APPROACHES TO INDIVIDUAL COUNSELING

Every approach to counseling has advantages and disadvantages. By using a combination of approaches, you may be able to increase your effectiveness and efficiency. Two alternatives to individual counseling are mentioned below.

Groups

While group counseling cannot offer the more directed, intense individual attention a pregnant adolescent may need, it can be an effective forum for teaching nutrition and behavior change principles, and for providing a "safe" place for adolescents to practice new skills. Furthermore, it is an opportunity for pregnant adolescents to share concerns and experiences, and to be exposed to new perspectives and skills which others may bring to the group.

Groups could be formed from pregnant adolescents attending the same health care clinic or high school, or pregnant adolescents with their partner, a friend, or a relative. Groups can:

- Provide a supportive network of peers and an opportunity to develop friendships. (This can be particularly valuable for a pregnant adolescent who is socially isolated.)
- Provide an effective forum for modeling behaviors and role-playing.
- Provide a good opportunity for teaching and practicing skills for resisting peer, media, and family pressures, especially through role-playing.
- Provide an opportunity for learning and practicing problem-solving skills. Brainstorming can be especially productive in groups.

Panels

Panels represent a variation of the group structure, yet can provide a different experience than adolescents could have in either group or one-to-one counseling. By forming a panel of new adolescent mothers, for example, you provide a unique opportunity for pregnant adolescents to hear from and ask questions of a peer who has "been there."

You might consider the following ideas when forming a panel:

- Be very selective when choosing the panel members. While much of the benefit to the pregnant adolescent is derived from learning of panel members' personal experiences, it is important that the panel not espouse misleading, inaccurate, or unhealthy practices.
- Use a semi-structured format in which a facilitator or moderator poses pre-formed questions to the panel so that discussion remains relatively focused.
- Allow adequate time for questions from the "audience."
- Panels might be composed of new adolescent mothers alone or with their partners.
- Possible topics for panel discussion:
  - Infant feeding practices: breast- vs. bottle-feeding
  - Exercise during pregnancy (where the panel would be composed of adolescents who had exercised during their pregnancy)
  - Food choices during pregnancy (e.g., making positive dietary changes; resisting peer, media, and family pressures; effective treatments of nausea, heartburn, and constipation)

PRACTICAL SUGGESTIONS FOR COMMON PROBLEMS

- Irregular use of prenatal vitamins.
  - Explore resistance to taking them.
    * "They're too big." Suggest cutting them into smaller pieces and, perhaps, mixing them into some food.
    * "They're not necessary." Suggest she think of them as "medicine" that she just has to take; or as "insurance," just in case.

- Explore obstacles in the physical environment.
  * The vitamins often are placed in a "logical," but inconvenient, location such as a medicine cabinet where they are not seen. Suggest she put them some place where she can't miss them (e.g., with her toothbrush, with her make-up, by the telephone or the mirror).
- Encourage her to enlist support from her partner, roommates, or family.

- Inactivity.
  - Explore resistance to increasing activity (often, there's no time; it's too cold/hot; it's not safe; disinterest in "sports;" no self-discipline; too "out of shape").
  - Discuss the variety of possible "activities" (not "sports" and not "exercises;" see Chapter 11).
  - Explore opportunities within the community: YWCA's, local high schools, community facilities, prenatal exercise classes.
  - Encourage her to involve others (e.g., her partner, a friend, roommate, a family member, a fellow pregnant adolescent, or taking the family pet) for companionship and support.
  - Help her in setting realistic and specific goals (e.g., to walk with her dog after school for 20 minutes three times in the coming week).
  - Remind her that to start small is better than not starting at all.
- "Eating well is inconvenient." (See Chapter 5)
  - Have the adolescent identify menu items at her favorite fast food restaurant that would be most nutritious.
  - Provide her with a list of convenient, nutritious snacks.
  - Encourage her to take along nutritious snacks when she's away from home.
  - Discuss ways in which she could plan ahead, so that she has nutritious leftovers which could be reheated or eaten cold.
- "Lack of self-discipline" to eat well.
  - By following the steps in the section, "Strategies for Dietary Change," she can learn to set goals which may enable her to develop self-discipline.
  - Remind her that everyone has problems with self-discipline so that she might be less self-critical.
  - Encourage her to ask others for support (e.g., friends, family, partner, roommates) when she needs it.
- "Lack of urgency" to be concerned about eating well.
  - Use pictures of babies, or have a new mother bring in her baby, to make the reality of her unborn baby more immediate and concrete.
  - Show her the particular stage of her baby's development; put her pregnancy into a time perspective she might more easily relate to (e.g., equating it to the length of a school year).
  - Use ultrasound pictures of her baby, if available, to reinforce the reality of the baby.
- Inadequate weight gain or excessive weight gain. (See Chapter 8 on Weight Issues & Management.)

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15

INFANT FEEDING CHOICES

Bonnie Spear, M.S., R.D.

The choice of an infant feeding method is an important component of prenatal counseling and education. Adolescents need help in making this decision; they need knowledge of different choices as well as advantages and disadvantages of each type.

METHODS OF INFANT FEEDING

Two major methods of infant feeding exist: breastfeeding and formula feeding. Additionally, many different types of formula are available. The following descriptions define the different types and forms of infant feeding with advantages and disadvantages, as well as relevance to adolescents.

Breastfeeding

- Advantages

  Nutritional Advantages: These include high lactalbumin/low casein ratio, special amino acid profile with low methionine and high cysteine, lecithin, polyunsaturated fats and high lactose appropriate for rapid brain growth, low sodium and adequate vitamin C and E, all which promote easy digestion and optimal growth and development.[1-3]

  Immunologic Benefits: Presence of secretory immunoglobulin A (IgA) and immunoglobulin to protect the immature infant gut from invasion by bacteria, viruses, or macromolecules.[1-3]

  Infection Protection: This includes viable macrophage and lymphocytes, lysozymes, bifidus factor, lactoferric interferon, complement and B_{12} - binding protein. The immunologic benefits help to protect infants from infection and disease.[1-3] Researchers have shown that breastfed children are protected from bacterial infection and disease more than formula-fed infants, but limited research has shown that only a small difference exists between the two groups in regards to viral infection. Specifically, ear infections appear significantly less often in breastfed infants than formula-fed infants.

  Allergy Prophylaxis: Infants who are at high risk for atopic disease are protected from absorbing macromolecules to which they could become sensitized because they are not exposed to these molecules.

  Psychological Benefit: Enhancement of maternal-infant interaction.

  Increased production of hormones, especially prolactin, that stimulate maternal behavior.

  Rapid involution of the uterus in response to the flow of oxytocin.

  Lower cost as compared to purchase of commercial formulas.

  (**Note:** It has been an accepted fact that breastfeeding aids in the mother's return to normal weight. Although breastfeeding does help the uterus to return to original size faster than in non-breastfeeding mothers, recent research[4-5] is questioning whether breastfeeding mothers actually lose weight more rapidly than non-breastfeeding mothers.

- Disadvantages

  Adolescent must assume total responsibility for feeding (except for occasional bottle of water).

  Limited ability to leave the baby until breastfeeding has been established.

  Limited use of alcohol, cigarettes and other drugs and medications. (See Table 1 for list of medications.)

- Adolescents and Breastfeeding

  Barriers to breastfeeding for the adolescent:

  Modesty - Adolescents often have problems with feeding in public (modesty, lack of privacy, public opinion, etc).

  Body image - Adolescents want to return to their original figure as soon as possible, and are often worried about breastfeeding increasing the size of their breasts.

  Returning to School - It is important for the adolescent to complete her education; therefore, unless the teen is very motivated, it is difficult to continue to breastfeed and return to school full time.

Table 1
Drug and Response to Breastfeeding[15]

Type of Drug	Indication
Analgesics (morphine, codeine, ibuprofen, meperidine, acetaminophen and aspirin	Apparently safe at normal doses
Antibiotics (Penicillin and related drugs, cephalosporins, gentamicin/tobramycin, amikacin, trimethoprim, nitrofurantoin)	Apparently safe
Sulfa Drugs	Can be given after first month
Erythromycin and clindamycin	High milk/plasma ratio
Tetracycline, chloramphenical, metronidazole	Not recommended
Insulin	Not excreted, but breastfeeding may lower dose needed; weaning should be done gradually
Anti-hypertensives Methyldopa, hydralazine, propranolol, spironolactone, clonidine, captopril	Apparently safe
Thiazides	May decrease milk supply, especially in first month
Furosemide	Use with caution
Nifedipine	Avoid
Decongestants Little data available; recommend: short acting, topical when appropriate, breastfeed frequently	May slow secretion of milk
Steroids Should be used only when clinically indicated	Low milk/plasma ratios
Mexthylxanthines Aminophyline, theophylline, related drugs	Use short acting and time dose if possible
Caffeine	May cause gastrointestinal distress in infants. Some infants are more sensitive than others.
Oral Contraceptives	
Combination pills	May decrease milk supply; low milk/plasma ratio
Progestin-only pills	Does not decrease milk
Immunizations	
Passive immunization (Rhogam, immunoglobulin)	Safe
Vaccinations using non-viable organisms	Safe
Polio and rubella	Apparently safe
Cigarettes	
Excessive smoking	May interfere with letdown reflex
Nicotine	Excreted in milk; *never* smoke during feeding

Drugs to Avoid

Atropine	Cimetidine
Lithium	Bromides
Iodides	Radioactive elements
Ergo-alkaloids (chronic use)	Chemotherapeutic agents

Independence - Completing the developmental task of independence is difficult for a teen mother and, by breastfeeding, this may again reduce the strive for independence by demanding she be available every few hours to feed the infant.

Lack of Support - Often the adolescent receives little or no support from her parents or from the baby's father to breastfeed. This makes it difficult to breastfeed and often teens will not even attempt to breastfeed due to this lack of support.[6]

A recent study revealed that adolescents who were most likely to breastfeed were those who: 1) perceived more benefits to breastfeeding, 2) desired more knowledge about breastfeeding, 3) were themselves breastfed, 4) reported supportive social environments (especially from the baby's father), and 5) perceived relatively few barriers to breastfeeding.[7]

The nutrient needs of the adolescent during lactation are greater than those of adult women in calories, protein, niacin and thiamin. But calcium appears to be of special importance. To prevent excessive bone demineralization, the breastfeeding adolescent needs to be encouraged to have calcium intakes above RDA or approximately 1600 mg. Research shows that few breastfeeding adolescents consume adequate calcium and therefore problems with bone demineralization may occur.[1, 8, 9] But, if adolescents consume adequate nutrients (especially calcium), there appears to be no contraindication to breastfeeding.

Formula Feedings

- Advantages
  - Allows other family members to share in the feeding process.
  - Allows mother to return to school or work (although successful breastfeeding has been done with freezing/storing breastmilk and supplementation while at school or work).
  - Use of medications such as birth control pills can begin immediately.
  - Can feed anywhere, no modesty problem.
  - Allows mother to decrease energy intake more extensively.
- Disadvantages
  - Does not provide immunity protection.
  - Does not provide infection protection.
  - Less convenient - have to worry about preparing bottle and keeping them at correct temperature.
  - Can be contaminated with bacteria unless properly handled.
  - Potential for incorrect dilution - if diluted too much can cause retarded growth, if diluted too little can cause dehydration of the infant.
- Several types of infant formulas are available. The types and indications for use are as follows:
  - Commercial Cow Milk-Based Formulas

    Commercial formulas (both cow milk-base and soy-base) approximate the composition of human milk as closely as possible. They cannot, however, be considered exact duplicates because of the immunologic properties of human milk. Most come with or without iron. Iron-fortified formulas are generally recommended because the term infant's iron supply is usually depleted by four months of age. No additional vitamin/mineral supplementation (other than possibly fluoride - See Table 2) is required with these formulas when they are consumed in appropriate quantities.
  - Evaporated Milk Formula

    Infant formula made from evaporated milk is an "old-fashioned" homemade formula. This is a low-cost formula, but requires knowledge of formulation as well as dedication to supplement the formula with the needed vitamin C, fluoride and iron[10, 11] (See Table 2). The correct formulation is given below.[11-13]

Recipe: Evaporated Milk Formula

One 13-ounce can whole evaporated milk, fortified with vitamins A and D.

10 oz. tap water (1-1/2 cans)

1 oz. (two tablespoons) sugar (either table sugar or corn syrup). Do not use honey.

Mix well, portion into sterilized individual bottles, cover and refrigerate. May also be refrigerated in a covered, clear bulk container.

  - Soy based formulas

    These are used for the infant who is sensitive or allergic (or potentially so) to cow milk protein, or who is having trouble digesting lactose.
  - Predigested formulas

    The protein, fat or carbohydrate, or all three are modified to make them more manageable to the infant with allergies or with digestive problems.
  - Goats milk formula

    This type of formula is not a recommended source of infant feeding. All goats milk is deficient in folacin and should not be offered without a food source and/or supplement of this nutrient.[11, 12]
  - Whole cows milk

    This is not recommended intake for infants. The high protein level has been suspected of causing

enteric blood loss and is thought to be one factor for the 50% incidence of iron deficiency seen in infants fed whole cows milk.[6,11]

For adolescents who choose commercial formulas, cow milk-based formulas and/or soy based formulas tend to be the most appropriate because they require less knowledge about preparation and supplementation. Since many of adolescent mothers and their infants are eligible for the Women's, Infant and Children's (WIC) food supplement program, cost of these formulas does not usually present a problem.[12]

Table 2
Nutrition Supplements

The Milk Feeding	Nutritional Supplements
Breastmilk	Vitamin D - 400 IU Fluoride+ - 0.25 mg (if not consuming fluoridated water)
Commercial formula	Fluoride+ - 0.25 mg (if not consuming fluoridated water or if using read- to-feed formula) Iron / 5-10 mg. at four months*
Evaporated milk formula	Fluoride+ - 0.25 mg (if water is not fluoridated) Vitamin C - 35 mg (or 3-4 ounces baby orange or apple juice) Iron - 5-10 mg - at four months*

+ 8 oz of fluoridated water between .7-1 ppm/day is adequate fluoride intake.

* The preterm baby on all feedings needs iron at two months.

(Preterm infants may need additional vitamin and mineral supplementation.[14])

Counseling and Education

Breastfeeding has more advantages than formula feeding for most babies. But formula feeding, appropriately conducted, is a highly accepted alternative. Babies fed both ways can be appropriately fed, overfed, and underfed. These are important concepts to convey to the adolescent. Studies have shown that education is the key to success of any feeding choice. Education cannot be done in one session. Table 3 gives suggestions on times and topics in discussing feeding choices.[2,3,11]

Topics to Cover

(Breastfeeding should be highly encouraged: however, because of adolescents issues and barriers to breastfeeding, this may not be the method of choice.)

- Breastfeeding
  - Benefits to mother and baby
  - Nipple preparation
  - Maternal dietary intake
    * calcium intake: needs to consume the RDA or above
    * increase in energy and protein intake
    * foods to avoid (i.e., chocolate, caffeine, onions)
    * proper ways to exercise and control food intake for weight reduction (recommend one pound per week)

Table 3
Anticipatory Guidance for Infant Feeding

Choice Weeks Gestation	Topic to Discuss
less than 12	Discuss infant feeding alternatives. Briefly state advantages and disadvantages.
12 -32	Continue discussion of all methods but focus on breastfeeding techniques and advantages.
32 - 40	Help patient make decision and provide details on chosen technique; also provide technique on other forms in case patient changes her mind at a later date. (Include discussion of introduction of solid foods.)

- Colostrum vs. mature milk
  * appearance
  * benefit (immunity, anti-infection)
  * initiation of mature milk
- Positioning of infant for feeding and burping
- Techniques for beginning and ending feeding
- Frequency and duration of feedings
  * An easy-to-follow guideline is as follows:

Day 1	4 feedings
Day 2	6 feedings
To 1 month	8-10 feedings
2-3 months	8 feedings
4-5 months	7 feedings
6-11 months	6 feedings

  * length of time/feeding
- How to handle problems of breastfeeding
  * sore nipples
  * engorgement
  * lack of family and peer support
- Supplementation with formula
  * When can begin without affecting breastfeeding
- Vitamin and mineral supplementation (if needed)
  * Formula feeding
- Different types (ready-to-feed, concentrated, powder)
- How to mix different types (include storage time in refrigerator, reading labels, difference between ready-to-feed, concentrated and powdered formulas, etc.)
- Aseptic techniques (included preparation, washing bottles, whether or not to boil preparation water, etc.)
- Positioning of infant for proper feeding and positioning of the bottle
- Burping
- What to do with leftover formula
- Feeding schedules to include recommended amounts for age

An easy-to-follow guide for formula intake:

	Percentile		
Age	**10th**	**50th**	**90th**
One month	14 oz.	20 oz.	28 oz.
Two months	23 oz.	28 oz.	34 oz.
Three months	25 oz.	31 oz.	40 oz.
Four months	27 oz.	34 oz.	45 oz.
Five months	27 oz.	34 oz.	45 oz.
Six months	30 oz.	37 oz.	50 oz.

Formula intakes are reported for only the first six months because that is generally the time that a child is kept on formula alone.

Used by permission from Salter, E. Child of Mine: Feeding with Love and Good Sense. Bull Publishing Co., Palo Alto, CA, 1983.

- Use of different types of nipples, size of bottles, and types of bottles
- Feeding frequency (how much, how often)
- Vitamin and mineral supplementation (if needed)

SUMMARY

It is important to provide adolescent mothers with knowledge about all forms of infant feeding. Since adolescents, biologically, can breastfeed, it is important to discuss with them the advantages and disadvantages. But the key to all education is to support the mother in her decision about feeding her infant.

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16

INTERCONCEPTION NUTRITION: POSTPARTUM CONCERNS

Bonnie A. Spear, M.S., R.D.

After delivery, most attention focuses on the newborn infant. Unfortunately, except for the postpartum visit, health care for the adolescent mother is frequently ignored. Studies have shown that adolescents who have one child by the age of 16 have a 70% chance of having another child by the age of 19.[1] This can present serious health and nutritional problems. One of these problems is severe dieting to lose pregnancy weight which may further deplete nutrient stores for subsequent pregnancies. In addition, the normal adolescent diet, which is high in fat and energy, added to the potential risk from certain medications such as oral contraceptives, puts the adolescent at even higher risk for nutritional problems. Nutrition counseling and therapy during the interconceptional period needs to focus on health education and health care promotion to make adolescents aware of what they can do to prevent disease and optimize health.

POSTPARTUM WEIGHT CONTROL

The patterns of weight loss after delivery have not been well documented in adolescents. For pregnant teens, the question of returning to normal weight is particularly pertinent.

Factors Influencing Postpartum Weight Loss

- Weight Gain

  The amount of weight gained during pregnancy will be directly related to the amount to be lost during postpartum period.

- Exercise

  The adolescent who does not exercise at all or consistently will have a more difficult time losing weight. (See Table 1 on exercise in Postpartum Concerns and Exercise chapter.)

- Birth Control Method

  If the adolescent decides on oral contraceptives, she may gain 1.35 to 2.7 kg due to the metabolic effects of the hormones involved.[2]

- Stress

  An adolescent under stress may lose weight in a short period of time or not lose weight at all. Stress to an adolescent may be returning to school, balancing school and child care, peer reaction and acceptance, relationship with the baby's father, and relationship with maternal grandmother. Some teens react by eating inappropriately such as meal skipping, fad dieting, or eating high energy dense foods. All of these reactions may put the teen at nutritional risk for rapid weight loss, nutrition depletion, anemia, or weight gain.

- Breastfeeding

  For the breastfeeding teen, added counseling is needed for "proper food intake" as well as a safe and appropriate weight loss plan (a maximum weight loss of one pound per week is recommended for breastfeeding mothers). An increased need for virtually all nutrients accompanies breastfeeding. Energy, protein, and calcium appear to be of special importance. To prevent bone demineralization, the teen needs to be encouraged to have intakes of calcium above the RDA, approximately 1600 mg.

- Motivation

  The adolescent who is not concerned with her weight, or makes no attempt to modify behaviors, will have little success losing weight. However, she still needs support and counseling for other potential nutritional problems. Other problems may include anemia, hypertension, inadequate diet, or selection of low nutrient dense foods.

Components of Postpartum Weight Loss Counseling

- Nutrition Education

  Information on reducing diets, ways to decrease calories, food preparation techniques, and portion control needs to be included in counseling sessions.

- Exercise

  This discussion should be centered around both aero-

bic and flexibility exercises. Suggestions should be given on appropriate activity, acceptability of activity, time involved, and how to fit it in their schedule of school and child care. (See Chapter 11, Table 1.)

- Behavior Modification

  A discussion of ways to cope with specific places, people, and occasions that may lead to overeating should be discussed.

Above all, the adolescent should be encouraged to establish an ongoing relationship with one of the professionals in the clinical program. This is one way to encourage the teen mother to keep appointments and ensure counseling is consistent.

Use of Oral Contraceptives in Adolescents

Oral contraceptives are the most popular form of contraception among adolescent females. It is estimated that oral contraceptives are administered to 43% of sexually active adolescents.[5] Although the lower doses of estrogen and progesterone that are used today for adolescents have fewer side effects than in the past, some side effects still exist. These include:

- Weight Gain

  Some teens experience a moderate weight gain of 1.35 to 2.7 Kg.[2] This should be explained and education provided on ways to limit this gain.

- Fluid Retention

  A part of the weight gain mentioned above can often be attributed to fluid retention. If she complains of excessive fluid retention, assessment and counseling should include an assessment of sodium intake and recommendations given to reduce excessive sodium intakes.

- Nausea

  This is a common complaint, but taking the pill at bedtime usually minimizes nausea.

- Decreased serum levels of folic acid and B_6.

  Decreased levels have been found in oral contraceptive users, but recent reports have been conflicting. When considering the adolescent diet which is typically low in folic acid, information on food sources of folic acid and B_6 should be provided as a preventive measure.[2] Sources of folic acid include green leafy vegetables, lean beef, dry beans and peas, broccoli, and yeast. Sources of B_6 include oatmeal, dried peas and beans, fortified cereals, cereal brans, eggs and organ meats.

- Fluctuation in Serum Lipids

  Many studies have examined the effects of oral contraceptive on serum lipids but, unfortunately, limited research has been done with adolescent oral contraceptive users. The following is a summary of research mainly on adults. (See Table 1 for Summary)

  - Lipid levels fluctuate primarily during the first six months oral contraceptive are used.[4,5]
  - Total Cholesterol — Oral contraceptive use has been shown to increase total cholesterol but levels are higher in women talking pills with greater than 50 mcg of estrogen.[6,7] Several studies[7-9] have shown no significant changes in serum lipids when using low estrogen (less than 30 mcg) oral contraceptives containing progestin, levonorgestril.
  - HDL-c- In women using oral contraceptives, the HDL-c levels varied with the type and dose of component steroids. Generally, HDL-C increased with increasing dose of estrogen and decreased with increasing dose of progesterone.[5,7,10-14]
  - Dietary intake — Few studies have looked at the diet as a potential source of variance in lipid levels. Unfortunately, this may have a major effect in adolescent oral contraceptive users because the typical diet of teenagers may approach 40% of total calories as fat.
  - Exercise — Studies suggest that exercise may partially compensate for lipid changes associated with oral contraceptive use. (Exercise has been shown to increase HDL-C levels.)[15,16]

- Changes in Blood Pressure

  Systolic blood pressure has been shown to be significantly higher in oral contraceptive users as compared

Table 1
Role of Oral Contraceptives on Serum Lipids and Blood Pressure

Total Cholesterol	Increased, especially when estrogen > 50 mcg
HDL-C*	Increases with increasing dose of estrogen Decreases with increasing dose of progesterone
LDL-C	Slight increase with all types of OCA's
Blood Pressure	Systolic increases Diastolic, no change

*Increased with exercise

with non-oral contraceptive users. There appears to be no significant difference seen in diastolic blood pressure between oral contraceptive users and non-oral contraceptive users.[17]

- Facial Pigmentation

  This side effect often occurs after prolonged use of oral contraceptives. Teens should be warned so they can notify their health care provider should facial pigmentation occur.

Counseling of Adolescents Using Oral Contraceptives

Discussion should include:

- Suggested food sources for folic acid and B_6.
- Desirability of maintaining a fat intake between 30-35% of total calories.
- Desirability of maintaining a daily aerobic exercise program.
- Risk factors such as smoking and their potential risk to the teenager.
- Counseling regarding dietary deficiences and excesses as determined by dietary assessment.

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17

HEALTH PROMOTION AFTER PREGNANCY

Lucy B. Adams, M.S.

Little information is available on the health and nutritional status of adolescents during the postpartum period. If the infant is living with the adolescent, there are increasing time demands and few incentives to eat well, exercise, etc. Risk factors for chronic illnesses seen in adulthood also have been identified in adolescents. Adolescent mothers are an ideal target for health-promoting activities because of a possible reduction in long-term risk of chronic health problems and potential benefits to the current health of the adolescent and her infant (Table 1).

ASSESSMENT FOR HEALTH PROMOTION

The evaluation of the postpartum adolescent has many similarities to the nutrition assessment during pregnancy but also explores other factors that affect the adolescent mother's health and long-term risk of health-related problems.

RELEVANT MEDICAL HISTORY

Exploration of the adolescent's medical history, pregnancy experience, and complications, can provide useful information on the current health risks of the postpartum adolescent.

DIETARY ASSESSMENT

Nutrition assessment in pregnancy and during the postpartum period are discussed in Chapters 7 and 16, respectively. The following are additional areas to be assessed in adolescent mothers:

- **Typical Dietary Pattern:** Changes in personal habits since the pregnancy and pre-pregnancy periods, infant feeding practices.

Table 1
Potentially Preventable Health Problems in Adolescent Mothers

Accidents
Acquired immune deficiency syndrome (AIDS)
Cancer
Cardiovascular disease, dyslipoproteinemia*, hypertension
Diabetes mellitus
Dietary inadequacies/excesses
Eating disorders
Emotional, physical, or sexual abuse or neglect of child
Infertility (associated with history of sexually transmitted diseases or pelvic infections)
Obesity
Osteoporosis
Overfeeding, underfeeding, or inadequate bonding with infant
Periodontal disease
Repeat pregnancy or complications of repeat pregnancy
Sexually transmitted diseases
Substance abuse (tobacco, alcohol, other drugs)

*Dyslipoproteinemia = abnormal levels of lipoprotein in the blood[8,9]

- **Body Image:** Satisfaction with current body shape, perceived ideal weight, difficulty achieving recommended body weight.
- **Food Resources:** Access to food, food purchasing, and preparation patterns. (One-third of 12- to 15-year-old mothers reported lack of money to buy food occasionally.)[1]
- **Meal Pattern:** Meal skipping, snacking, or binge eating.
- **Use of vomiting,** laxatives, diuretics, diet pills, fasting, restrictive dieting, or excessive exercise to lose weight.
- **Weight and Height History:** Current, prepregnancy, and pregnancy levels.

HEALTH ATTITUDES AND BEHAVIORS

Participation in unhealthy behaviors (e.g., substance abuse, lack of aerobic activity) places adolescents at medical risk and may be associated with other "risky" behaviors.[2]

- **Physical Activity:** Current frequency, type, duration; pregnancy and pre-pregnancy level of exercise.
- **Contraceptive Use and Sexual Activity:** Frequency of unprotected intercourse, history of sexually transmitted disease (STD), type of contraceptive, number of partners, sex with high risk partner (bisexual, or history of STD, multiple partners, intravenous drug use).
- **Substance Use:** Frequency of the use of alcohol, tobacco, marijuana, intravenous drugs, and others. Postpartum use may be significant; pregnant adolescents were found more likely to smoke cigarettes than non-pregnant adolescents.[3]
- **Safety Behaviors:** Use of safety devices in car, motorcycle, boat, bicycle; extent of driving when intoxicated or reckless operation of vehicle; "childproofing" infant's home; use of child car seat.
- **Other:** Dental hygiene and dental exam frequency; sun exposure and sunscreen use; and frequency of breast self-examination.

PSYCHOSOCIAL ISSUES

Cultural, emotional, and socioeconomic factors can have a large impact upon access to care, the ability to cope with the demands of adolescence and motherhood, and compliance with health-related recommendations. The following issues are important to assess.

- Feelings about motherhood; adequacy of parenting skills.
- Financial and living situation; education or employment plans.
- Peers: presence of same sex or opposite sex relationships; peer health behaviors (e.g., smoking).
- Emotional health: self-esteem, feelings of isolation or depression, emotional support.
- History of abuse (physical, emotional, sexual).
- Motivation to make behavior changes.

PHYSIOLOGICAL ISSUES

Anthropometrics and Physical Exam

- **Height and Weight:** Calculate relative body weight using 50th percentile weight for height for age from the National Center for Health Statistics (NCHS) as ideal weight.[4] Relative Body Weight (RBW) = actual weight/ideal weight x 100.
- **Blood Pressure and Pulse:** Repeat blood pressure measurements should be taken, expecially those with a history of hypertension, pregnancy-induced hypertension, or pre-eclampsia. Postural changes in blood pressure should be measured if there is any suspicion of an eating disorder.[5]
- Clinical signs of nutritional problems.

Laboratory Testing

- Total blood cholesterol (or plasma lipoprotein panel) assessment if family history of cardiovascular disease, personal history of dyslipoproteinemia, or other risk factors (obesity, hypertension, oral contraceptive use, cigarette smoking).
- Complete Blood Count (CBC) if history of anemia, low iron intake, or if adolescent is less than three years post menarcheal.
- Electrolytes, amylase, and/or urine specific gravity (to rule out dehydration) if an eating disorder is suspected; other tests may be indicated depending on severity of symptoms.[5]
- If malnutrition or specific nutritional deficiencies are suspected, follow guidelines in Chapter 4.

EVALUATION OF THE POSTPARTUM ADOLESCENT

Review of the assessment information should lead to the identification of warning signals or risk factors. Tables 2 and 3 list the potential health-related and nutrition-related problems, respectively, associated with each warning sign.

Table 2
Warning Signs of Health-Related Problems

Assessment Information	Potential Problem
• Alcohol Use	Other substance abuse, cancer, hypertension, diabetes mellitus, liver disease, pregnancy complications in repeat pregnancy, accident
- When operating car, bicycle, etc.	
• Cigarette smoking	Cancer, CVD, dyslipoproteinemia, pregnancy complications in repeat pregnancy, pulmonary and periodontal disease
• Complications in previous pregnancy	Pregnancy complications in repeat pregnancy
• Drug use	Other substance abuse, pregnancy complications in repeat pregnancy
- When operating car, bike, boat, etc.	Accident
- Intravenous drug use, sharing needles	AIDS
• Dyslipoproteinemia[8]	
- Total cholesterol (TC) > 170mg/dl	CVD
- High density lipoprotein cholesterol (HDL-C) < 45 mg/dl	CVD
• Eating disorder or dietary inadequacies	Pregnancy complications in repeat pregnancy
• Family history of dyslipoproteinemia hypertension, stroke/heart attack (in male relative < 50 years or female relative < 60 years)	Dyslipoproteinemia, hypertension, CVD
• History of hypertension or elevated blood pressure (current or prenatal)	Hypertension, pregnancy complications in repeat pregnancy
• Inadequate protection from sun exposure	Cancer
• Infrequent breast self-examination	Delayed diagnosis of cancer
• Obesity	Hypertension, dyslipoproteinemia, pulmonary disease, CVD, diabetes mellitus, cancer
• Oral contraceptive use[7]	Dyslipoproteinemia, hypertension, CVD
• Poor dental hygiene, infrequent checkups	Periodontal disease
• Poor safety behavior (road, water, home)	Accident
- non-use seat belt, child carseat, helmet	
- traffic tickets, unsafe driving, riding with impaired driver, poor child safety	
• Sexual activity without contraception	Repeat pregnancy, STD/AIDS
- non-use of barrier methods	STD/AIDS
- sex with high risk partner	AIDS
- history of STD	Infertility

Legend: CVD = Cardiovascular Disease, STD = Sexually Transmitted Disease

Table 3
Warning Signs of Nutrition-Related Problems

Assessment Information	Potential Problem
• Fasting, meal skipping, or restrictive dieting	Eating disorder, dietary inadequacy
• Weight for height/age percentile at or below 25th percentile or relative body weight <85%	Eating disorder, dietary inadequacy, osteoporosis
• Clinical signs of nutritional deficiencies	Dietary inadequacy, individual or multiple
• Limited food resources or ability to buy food	Dietary inadequacy
• Food choices high in saturated fat, total fat	CVD, dyslipoproteinemia, cancer, obesity
• Food choices high in dietary cholesterol	CVD, dyslipoproteinemia
• Food choices low in dietary fiber	CVD, dyslipoproteinemia, cancer, gastrointestinal disease
• Food choies low in calcium, calories	Osteoporosis, dietary inadequacy
• Food choices low in vitamin A	Cancer, dietary inadequacy
• Food choices high in caloric density	Obesity
• Aerobic exercise <3 times per week	Obesity, osteoporosis
• Distorted body image/extreme fear of fatness, Difficulty coping with bodily changes of pregnancy (edema, breast and weight changes)	Eating disorder, pregnancy complications in repeat pregnancy
• Vomiting, laxatives, or other purging behavior	Eating disorder, pregnancy complications in repeat pregnancy
• Frequent binge-eating, emotion-linked eating; Difficulty with, or unrealistic expectations for, weight loss following pregnancy	Eating disorder, pregnancy complications in repeat pregnancy
• Excessive exercise	Eating disorder, pregnancy complications in repeat pregnancy
• Substance use	Dietary inadequacy, pregnancy complications in repeat pregnancy
• Pulse <60 beats/minute or postural change in pulse (decrease ≥35/minute) or blood pressure (decrease ≥20 mm Hg)[5]	Eating disorder, dehydration

Legend: CVD = Cardiovascular Disease

OBSTACLES TO COMPLIANCE

Numerous factors affect adolescent mothers' adherence to health-promoting recommendations. Many "barriers" (see Table 4) experienced by adolescent mothers[6] can: (1) make it more difficult to initiate a behavior change; (2) provide little reinforcement for practicing positive behaviors; or (3) increase the practice of risky behaviors. The physical effects of childbirth and the demands of infant care leave little energy for major lifestyle changes, especially combined with employment or school attendance. There is often realignment of family roles or difficulties with partners, with limited support for making change. Also, coping with the stresses of adolescent motherhood may increase substance abuse, negative eating behavior, etc.

COUNSELING AND EDUCATION

The postpartum period is a transitional time where an adolescent needs to take personal responsibility for her own health, as well as her infant's. Although this may be perceived as too stressful a time to initiate change, many behavior changes can be made to enhance health in the adolescent mother.

RECOMMENDATIONS FOR HEALTH PROMOTION OF POSTPARTUM ADOLESCENTS

Instead of expecting abstinence from all risky behaviors, realistic goals include:

- Delayed onset of health-compromising behaviors;

Table 4
Obstacles to Behavior Change in Postpartum Adolescents

- Fatigue or physical discomfort
- Postpartum depression
- Easy access to health-compromising behaviors (smoking, poor food choices)
- Little free time available (e.g., to exercise)
- Small perceived benefit from making recommended change
- Poor financial resources or access to transportation
- Limited access to health care, nutrition/health counseling
- Relative as major source of health information, not provider[9]
- Additional stressful events or losses (e.g., marriage, parental divorce, breakup of relationship, financial problems)
- Substance abuse
- Little social support; chaotic or isolated home environment

- Reduced intensity or frequency; (e.g., five cigarettes/day instead of 20); or
- Responsible experimentation (e.g., effective contraception with sexual activity).

Body Image and Body Weight

The long-term goal for body weight is maintenance of weight between the 25th and 75th percentiles of weight for height and age. Providers need to discourage fasting, dieting, and purging behavior, and give realistic expectations for body shape and size.[10] Caution must be exercised in recommending weight loss or setting weight goals for adolescents, as eating disorder patients have reported dieting attempts or comments about weight as the initial trigger for extreme dieting behavior. Adolescents with warning signs for eating disorders should be identified and evaluated[11] by an interdisciplinary team skilled in working with these patients.

Programs for obese adolescents that have been shown to be effective combine exercise and dietary recommendations within a behavioral context, addressing the complex factors affecting adolescent eating behavior.[12] The obese, lactating mother should be encouraged to exercise, but not to reduce energy intake until the infant is weaned.

Dietary Intake

Nutritional objectives for the postpartum period were covered in Chapter 16 and include:

- Rebuilding nutrient stores depleted by pregnancy and pre-pregnancy dietary inadequacies;
- Appropriate weight management; and
- Meeting increased nutrient needs if breastfeeding.

Food choices should be moderately low in total fat (approximately 30% of calories), saturated fat ($\leq$10% of calories), dietary cholesterol ($\leq$300 mg per day), and sodium (<5 grams per day);[13,14] and sufficient in complex carbohydrates (50-60% of calories), dietary fiber, energy, and nutrient density (especially calcium, iron, and vitamin A).[15,16]

Exercise

Cardiorespiratory fitness achieved through regular aerobic exercise has been associated with lower body fat, improved lipoprotein pattern, weight loss, lower blood pressure, etc. Aerobic exercise at least three times per week for 20-30 minutes is considered the minimum to achieve a fitness effect. Table 5 shows examples of aerobic activities suitable for postpartum mothers who do not have exercise restrictions.

Psychosocial Issues

Therapeutic counseling, stress management, and location of resources for economic, educational, and vocational needs should be recommended. Mothers having difficulty with managing their anger or frustration or showing other signs of potential abuse should be referred to appropriate agencies and followed regularly.

Substance Use And Sexual Activity

One goal is for limited or non-use of cigarettes, alcohol, marijuana, intravenous drugs, and others. Some communities have smoking cessation and/or alcohol or drug dependency programs tailored to adolescents. Also, ideally, adolescents should delay continued sexual activity until older or utilize effective contraception for prevention of pregnancy and sexually transmitted diseases. Effective contraception that prevents exchange of body fluids is most important for adolescents with multiple partners or whose single partner is at elevated risk for AIDS (multiple partners previously, intravenous drug use, bisexual).

Safety Behavior/Sun Exposure/Self-Examination

Regular practice of water and road safety should be promoted; for example, seatbelt and child car seat use, avoiding substance use when operating a vehicle, and traveling at an appropriate speed. In addition, "childproofing" and other safety precautions should be taken to prevent childhood accidents. Appropriate protection from overexposure to the sun and monthly breast examination should be encouraged.

Table 5
Exercises Recommended After Pregnancy

Physical Activities that Do Promote Cardiorespiratory Fitness	Physical Activities that Can Promote Cardiorespiratory Fitness
Aerobic dancing	Badminton
Cross-country skiing	Basketball
Fencing	Bicycling or exercise bike use
Hiking or mountain climbing	Calisthenics or exercise program
Jogging or running	Dancing
Race walking or power walking	Handball or racquetball
Rowing, canoeing, or crew	Ice skating
Soccer	Martial arts (judo, karate, etc.)
Swimming	Mini-trampoline use
Walking briskly	Rollerskating
Water aerobics	Rowing machine use
Water polo	Tennis (singles only)
	Walking
	Wrestling

INTERVENTION STRATEGIES TO MAXIMIZE BEHAVIOR CHANGE

The large number of personal, environmental, and societal obstacles to practicing healthy behaviors dictates the need for the postpartum adolescent to set realistic goals. Chapter 13 outlines comprehensive counseling techniques for the pregnant adolescent that also can be applied to the adolescent mother. Risk assessment to identify current and potential health problems should be combined with a discussion of:

- How to approach the specific behavior change;
- The costs and benefits of practicing healthy behaviors (feel better or look better);
- The consequences of not changing; and
- Correction of misconceptions.

Additional strategies found effective in health promotion of adolescents[17,18] are listed in Table 6.

Emphasis should be on personalizing recommendations and helping her integrate changes into her existing lifestyle. The adolescent mother who feels there is no time to exercise may be able to take regular brisk walks pushing a stroller. Another factor is that the practice of risky behaviors such as early sexual activity/adolescent pregnancy may help accomplish certain developmental tasks of adolescence (e.g., individuation from the family).[1] It is important to identify positive behaviors and alternate strategies that facilitate coping with motherhood, as well as normal adolescent development. This may require training of adolescents in skills (e.g., decision-making, peer pressure resistance) that enhance the adolescent's confidence or ability to make a change. Obese adolescents in Shapedown, a skills-based, behavioral weight management program showed improvement in self-esteem, dietary and exercise habits, and weight loss.[12] The individual's application of the above

Table 6
Intervention Strategies to Maximize Behavior Change

- Screen for potential nutrition and health-related problems
- Help adolescent set realistic goals
- Give practical information (written and verbally)
- Acknowledge developmental needs served by "risky" behavior
- Teach communication, assertiveness, and problem-solving skills
- Encourage emotional support from family and friends
- Follow-up with adolescent mother on regular, long-term basis
- Interdisciplinary team approach: nutritionist, mental health professional, physician/nurse practitioner, exercise physiologist

strategies and resulting behavior change may be a long process. Regular contact with the adolescent mother, assessing progress, and encouraging gradual changes over an extended period of time, enhances results. When possible, the partner and/or baby's father, peers, parents, and other relatives should form a supportive network, reinforcing the adolescent mother's healthy behavior. When working with adolescent mothers, health promotion issues are often clouded by psychological, socioeconomic, nutritional, and medical factors. A comprehensive health team is essential and, if not available, appropriate referrals should be made.

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Appendix A

FOOD SOURCES OF KEY NUTRIENTS

CALORIC VALUE OF FOODS WITHIN FOOD GROUPS

SAMPLE MENU PLANS FOR PREGNANCY

Food Sources of Key Nutrients[a]

Food Sources of Protein		Protein Content	
Food	Amount	Grams	% of Total Calories Provided by Protein
Animal Products			
shrimp	3 ounces	21.0	84
low-fat cottage cheese	1 cup	38.0	74
chicken (no skin)	3 ounces	20.0	70
pork chop (lean)	3 ounces	20.0	59
tuna	3 ounces	24.0	56
beef liver	3 ounces	20.0	46
beef steak (lean)	3 ounces	24.0	44
beef roast (lean)	3 ounces	25.0	41
skim milk	1 cup	9.0	40
fish (haddock)	3 ounces	19.0	38
leg of lamb	3 ounces	22.0	37
hamburger (regular)	3 ounces	21.0	34
sausage (pork links)	3 ounces	17.0	28
Swiss cheese	1 ounce	8.0	30
egg	1 medium	6.0	30
cheddar cheese	1 ounce	7.0	27
low-fat yogurt	1 cup	8.0	27
whole milk	1 cup	9.0	23
hot dog	1	6.0	15
Legumes and Nuts			
soybeans (cooked)	1 cup	20.0	33
split peas (cooked)	1 cup	9.0	31
lima beans (cooked)	1 cup	12.0	27
dried beans (cooked)	1 cup	15.0	26
peanuts	1/4 cup	9.0	17
peanut butter	1 tablespoon	4.0	17
walnuts	1/4 cup	7.0	14
almonds	1/4 cup	7.0	14
Grains			
corn	1 cup	5.0	29
egg noodles	1 cup	7.0	25
oatmeal	1 cup	5.0	15
whole-wheat bread	1 slice	2.5	15
macaroni	1 cup	5.0	13
white bread	1 slice	2.2	13
rice	1 cup	4.0	11

[a]From Brown, J.E. The Science of Human Nutrition. Harcourt Brace Jovanovich, 1990

Food Sources of Key Nutrients[a]

Food Sources of Fat		Fat Content	
Food	**Amount**	**Grams**	**% of Total Calories**
Fats and Oils			
butter	1 teaspoon	4.0	100
margarine	1 teaspoon	4.0	100
oil	1 tablespoon	4.7	100
mayonnaise	1 tablespoon	11.0	99
heavy cream	1 tablespoon	5.5	93
salad dressing	1 tablespoon	6.0	83
gravy	1/4 cup	14.0	77
salad dressing, low-cal	1 tablespoon	1.0	45
Animal Meats, Eggs			
hot dog	1 (2 ounces)	17.0	83
bologna	1 ounce	8.0	80
sausage	4 links	18.0	77
bacon	3 pieces	9.0	74
salami	2 ounces	11.0	68
egg	1	6.0	68
pork, beef, or veal fat	3 ounces	18.0	62
hamburger, regular (20%	3 ounces	18.0	62
fat)	3 ounces	14.0	53
chicken, fried with skin	6.6 ounces	31.4	52
Big Mac	6.8 ounces	28.6	50
Quarter Pounder with	8.9 ounces	32.0	48
Cheese	3 ounces	9.5	45
Whopper	11 ounces	21.9	43
hamburger, lean (10% fat)	3 ounces	8.0	39
TV dinner, pork	3 ounces	7.0	38
pork, beef, or veal (lean)	3 ounces	1.0	13
tuna in oil, drained	3 ounces	4.0	25
flounder, baked	3 ounces	1.0	9
chicken, baked, without	3 ounces	1.0	7
skin			
shrimp, boiled			
tuna in water			
Dairy Products			
cheddar cheese	1 ounce	9.5	74
whole milk	1 cup	8.5	49
2% milk	1 cup	5.0	32
1% milk	1 cup	2.7	24
yogurt with fruit	1 cup	2.6	10
skim milk	1 cup	0.4	4
Other			
avocado	1/2	15.0	84
sunflower seeds	1/4 cup	17.0	77
peanut butter	1 tablespoon	8.0	76
peanuts	1/4 cup	17.5	75
potato chips	1 ounce (13 chips)	11.0	61
chocolate chip cookies	4	11.0	54
french fries	20 fries	20.0	49

[a]From Brown, J.E. The Science of Human Nutrition. Harcourt Brace Jovanovich, 1990

Food Sources of Key Nutrients[a]
Minerals

Calcium

Milk and Milk Products	Amount	Calcium, mg
low-fat yogurt	1 cup	415
low-fat yogurt with fruit	1 cup	315
skim milk	1 cup	300
1% milk	1 cup	300
2% milk	1 cup	298
3.25% milk (whole)	1 cup	288
Swiss cheese	1 ounce	270
cheddar cheese	1 ounce	205
frozen yogurt	1 cup	200
cream soup	1 cup	186
pudding	1/2 cup	185
ice cream	1 cup	180
ice milk	1 cup	180
American cheese	l ounce	175
custard	1/2 cup	150
cottage cheese	1/2 cup	70
low-fat cottage cheese	1/2 cup	69
Vegetables		
collard greens, cooked	1/2 cup	110
spinach, cooked	1/2 cup	90
broccoli	1/2 cup	70
Legumes		
Tofu	1/2 cup	155
dried beans, cooked	1/2 cup	50
lima beans	1/2 cup	40

Iron

Meat and Meat Alternatives	Amount	Iron, mg
liver	3 ounces	7.5
round steak	3 ounces	3.0
hamburger, lean	3 ounces	3.0
baked beans	1/2 cup	3.0
pork	3 ounces	2.7
white beans	1/2 cup	2.7
soy beans	1/2 cup	2.5
pork and beans	1/2 cup	2.3
lima beans	1/2 cup	2.2
black-eyed peas	1/2 cup	1.7
fish	3 ounces	1.0
chicken	3 ounces	1.0
Grains		
iron-fortified breakfast cereals	1 cup	8.0 (4-18)
oatmeal (fortified)	1 cup	8.0
bagel	1	1.7
English muffin	1	1.6
rye bread	1 slice	1.0
whole-wheat bread	1 slice	0.8
white bread	1 slice	0.6
Fruit		
prune juice	6 ounces	7.0
dried apricots	1/2 cup	2.5
prunes	5 medium	2.0
raisins	1/4 cup	1.3
plums	3 medium	1.1
Vegetables		
spinach, cooked	1/2 cup	2.3
peas	1/2 cup	1.6
asparagus	1/2 cup	1.5

[a]From Brown, J.E. The Science of Human Nutrition. Harcourt Brace Jovanovich, 1990

Food Sources of Key Nutrients[a]
Minerals

Magnesium

Legumes	Amount	Magnesium, mg
lentils, cooked	1/2 cup	134
split peas, cooked	1/2 cup	134
tofu	1/2 cup	130
black-eyed peas	1/2 cup	58
lima beans	1/2 cup	32
Nuts		
peanuts	1/4 cup	247
cashews	1/4 cup	93
almonds	1/4 cup	80
Grains		
Bran Buds®	1 cup	240
wild rice, cooked	1/2 cup	119
fortified breakfast cereal	1 cup	85
wheat germ	2 tablespoons	45
Vegetables		
bean sprouts	1/2 cup	98
spinach, cooked	1/2 cup	48
Milk and Milk Products		
milk	1 cup	30
cheddar cheese	1 ounce	8
American cheese	1 ounce	6
Meats		
chicken	3 ounces	25
beef	3 ounces	20
pork	3 ounces	20

Phosphorous

Milk and Milk Products	Amount	Phosphorous, mg
yogurt	1 cup	327
skim milk	1 cup	250
whole milk	1 cup	250
cottage cheese	1/2 cup	150
American cheese	1 ounce	130
Meats		
pork	3 ounces	275
hamburger	3 ounces	165
tuna	3 ounces	162
lobster	3 ounces	125
chicken	3 ounces	120
Nuts and Seeds		
sunflower seeds	1/4 cup	319
peanuts	1/4 cup	141
pine nuts	1/4 cup	106
peanut butter	1 tablespoon	61
Grains		
bran flakes	1 cup	180
shredded wheat	2 large biscuits	81
whole-wheat bread	1 slice	52
noodles	1/2 cup	47
rice	1/2 cup	29
white bread	1 slice	24
Vegetables		
potatoes	1 medium	101
corn	1/2 cup	73
peas	1/2 cup	70
french fries	1/2 cup	61
broccoli	1/2 cup	54
Other		
milk chocolate	1 ounce	66
cola	12 ounces	51
diet cola	12 ounces	45

[a]From Brown, J.E. The Science of Human Nutrition. Harcourt Brace Jovanovich, 1990

Food Sources Key Nutrients[a]
Minerals

Zinc

Food	Amount	Zinc, mg
Meats		
liver	3 ounces	4.6
beef	3 ounces	4.0
crab	1/2 cup	3.5
lamb	3 ounces	3.5
turkey ham	3 ounces	2.5
pork	3 ounces	2.4
chicken	3 ounces	2.0
Legumes		
dried beans, cooked	1/2 cup	1.0
split peas, cooked	1/2 cup	0.9
Grains		
fortified breakfast cereals	1 cup	1.5 - 4.0
wheat germ	2 tablespoons	2.4
brown rice	1 cup	1.2
oatmeal	1 cup	1.2
bran flakes	1 cup	1.0
white rice	1 cup	0.8
Nuts and Seeds		
pecans	1/4 cup	2.0
cashews	1/4 cup	1.8
sunflower seeds	1/4 cup	1.7
peanut butter	2 tablespoons	0.9
Milk and Milk Products		
cheddar cheese	1 ounce	1.1
milk (whole)	1 cup	0.9
American cheese	1 ounce	0.8

[a]From Brown, J.E. The Science of Human Nutrition. Harcourt Brace Jovanovich, 1990

Food Sources Key Nutrients[a]
Vitamins

Vitamin A

Food	Amount	Vitamin A, IU
Meats and Eggs		
liver	3 ounces	45,400
crab	1/2 cup	1,680
egg yolk	1 medium	590
Milk and Cheese		
whole milk	1 cup	330
fortified skim milk	1 cup	330
American cheese	1 cup	330
Swiss cheese	1 cup	320
2% milk	1 ounce	210
unfortified skim milk	1 ounce	10
Fats		
butter	1 teaspoon	160
margarine (fortified)	1 teaspoon	160
Vegetables		
carrot, raw	1 medium	7,900
sweet potato	1/2 cup	7,850
pumpkin	1/2 cup	7,840
spinach, cooked	1/2 cup	7,300
collards, cooked	1/2 cup	6,030
winter squash	1/2 cup	4,200
red peppers	1/2 cup	2,225
broccoli	1/2 cup	1,900
Fruits		
cantaloupe	1/4	5,400
apricots, canned	1/2 cup	2,260
papaya	1/2 cup	1,595
watermelon	2 cups	1,265
peaches, canned	1/2 cup	1,115
nectarine	1	1,001

[a]From Brown, J.E. The Science of Human Nutrition. Harcourt Brace Jovanovich, 1990

Food Sources Key Nutrients[a]
Vitamins

Niacin and its Provitamin, Tryptophan

Food	Amount	Niacin, mg	Tryptophan, mg
Meats			
liver	3 ounces	14.0	1,766
tuna	1/2 cup	10.3	238
turkey	3 ounces	9.5	291
chicken	3 ounces	7.9	311
salmon	3 ounces	6.9	229
veal	3 ounces	5.2	399
beef (round steak)	3 ounces	5.1	297
pork	3 ounces	4.5	313
haddock	3 ounces	2.7	155
scallops	3 ounces	1.1	252
Milk and Milk Products			
cottage cheese	1/2 cup	trace	156
Swiss cheese	1 ounce	trace	114
whole milk	1 cup	trace	112
cheddar cheese	1 ounce	trace	91
colby cheese	1 ounce	trace	87
Grains			
wheat germ	1 ounce (1/4 cup)	1.5	76
brown rice	1/2 cup	1.2	25
noodles, enriched	1/2 cup	1.0	37
rice, white, enriched	1/2 cup	1.0	23
bread, enriched	1 slide	0.7	26

Riboflavin

Food	Amount	Riboflavin, mg
Milk and Milk Products		
milk	1 cup	0.5
2% milk	1 cup	0.5
low-fat yogurt	1 cup	0.5
skim milk	1 cup	0.4
yogurt	1 cup	0.1
American cheese	1 ounce	0.1
cheddar cheese	1 ounce	0.1
Meats and Eggs		
liver	3 ounces	3.6
pork chop	3 ounces	0.3
beef	3 ounces	0.2
egg	1	0.2
tuna	1/2 cup	0.1
Vegetables		
collard greens	1/2 cup	0.3
broccoli	1/2 cup	0.2
spinach, cooked	1/2 cup	0.1
Grains		
macaroni	1 cup	0.1
bread	1 slice	0.1

[a]From Brown, J.E. The Science of Human Nutrition. Harcourt Brace Jovanovich, 1990

Food Sources Key Nutrients[a]
Vitamins

Thiamin

Food	Amount	Thiamin, mg
Meats		
pork roast	3 oz	0.8
beef	3 oz	0.4
ham	3 oz	0.4
liver	3 oz	0.2
Nuts and Seeds		
sunflower seeds	1/4 cup	0.7
peanuts	1/4 cup	0.1
almonds	1/4 cup	0.1
Grains		
bran flakes	1 cup	0.6
macaroni	1 cup	0.2
rice	1 cup	0.2
bread	1 slice	0.1
Vegetables		
peas	1/2 cup	0.3
lima beans	1/2 cup	0.2
corn	1/2 cup	0.1
broccoli	1/2 cup	0.1
potato	1	0.1
Fruits		
orange juice	1 cup	0.2
orange	1	0.1
avocado	1/2	0.1

Folacin

Food	Amount	Folacin, mcg
Vegetables		
asparagus	1/2 cup	120
brussels sprouts	1/2 cup	116
black-eyed peas	1/2 cup	102
spinach, cooked	1/2 cup	99
romaine lettuce	1	86
lima beans	1/2 cup	71
peas	1/2 cup	70
collard greens, cooked	1/2 cup	56
sweet potato	1/2 cup	43
broccoli	1/2 cup	43
Fruits		
cantaloupe	1/4	100
orange juice	1 cup	87
orange	1	59
Grains		
oatmeal	1/2 cup	97
wheat germ	1/4 cup	80
wild rice	1/2 cup	37

[a]From Brown, J.E. The Science of Human Nutrition. Harcourt Brace Jovanovich, 1990

Food Sources Key Nutrients[a]
Vitamins

Vitamin B_6

Food	Amount	Vitamin B_6, mg
Meats and Eggs		
liver	3 ounces	0.8
salmon	3 ounces	0.7
other fish	3 ounces	0.6
chicken	3 ounces	0.4
ham	3 ounces	0.4
hamburger	3 ounces	0.4
veal	3 ounces	0.4
egg	1	0.3
pork	3 ounces	0.3
beef	3 ounces	0.2
Legumes		
split peas	1/2 cup	0.6
dried beans, cooked	1/2 cup	0.4
Fruits		
banana	1	0.6
avocado	1/2	0.4
watermelon	1 cup	0.3
Vegetables		
turnip greens	1/2 cup	0.7
brussels sprouts	1/2 cup	0.4
potato	1 cup	0.2
sweet potato	1/2 cup	0.2
carrots	1/2 cup	0.2
peas	1/2 cup	0.1

Vitamin B_{12}

Food	Amount	Vitamin B_{12}, mg
Meats and Eggs		
liver	3 ounces	6.8
trout	3 ounces	3.6
beef	3 ounces	2.2
clams	1/2 cup	2.0
crab	3 ounces	1.8
lamb	3 ounces	1.8
tuna	1/2 cup	1.8
veal	3 ounces	1.7
hamburger, regular	3 ounces	1.5
egg	1	0.6
Milk and Milk Products		
skim milk	1 cup	1.0
milk	1 cup	0.9
yogurt	1 cup	0.8
cottage cheese	1/2 cup	0.7
American cheese	1 ounce	0.2
cheddar cheese	1 ounce	0.2

[a]From Brown, J.E. The Science of Human Nutrition. Harcourt Brace Jovanovich, 1990

Food Sources Key Nutrients[a]
Vitamins

Vitamin C

Food	Amount	Vitamin C, mg
Fruits		
kiwi fruit	1 or 1/2 cup	108
orange juice	6 ounces	87
orange	1	85
cantaloupe	1/4	63
grapefruit juice	6 ounces	57
cranberry juice	1/2 cup	54
grapefruit	1/2 cup	51
strawberries	1/2 cup	48
watermelon	1 cup	31
grape juice	1/2 cup	29
raspberries	1/2 cup	18
Vegetables		
green peppers, raw	1/2 cup	95
cauliflower, raw	1/2 cup	75
broccoli, cooked	1/2 cup	70
brussels sprouts	1/2 cup	65
collard greens	1/2 cup	48
cauliflower, cooked	1/2 cup	30
potato	1	29
tomato, raw	1/2	23

[a]From Brown, J.E. The Science of Human Nutrition. Harcourt Brace Jovanovich, 1990

Caloric Values of Foods Within Food Groups[a]

Food	Amount	Calories
Milk and Dairy Products		
evaporated milk	1 cup	345
custard	1 cup	305
ice cream	1 cup	290
ice milk	1 cup	285
soft serve	1 cup	265
cottage cheese	1 cup	260
cocoa	1 cup	245
pudding	1 cup	225
cottage cheese, low fat	1 cup	170
milk, whole	1 cup	160
milk, 2%	1 cup	145
yogurt, low fat	1 cup	120
Swiss cheese	1 ounce	105
cheddar cheese	1 ounce	105
blue cheese	1 ounce	105
American cheese	1 ounce	105
skim milk	1 cup	90
Meat and Meat Alternatives		
chili	1 cup	335
spaghetti with meat sauce	1 cup	330
ham	3 ounces	245
hamburger, regular	3 ounces	245
roast beef, lean	3 ounces	245
sausage links	3 ounces	245
roast lamb, lean	3 ounces	235
dried beans, cooked	1 cup	230
steak, lean	3 ounces	220
stew	1 cup	216
almonds	1/4 cup	213
peanuts	1/4 cup	210
walnuts	1/4 cup	198
cashews	1/4 cup	196
corned beef	3 ounces	185
hamburger, lean	3 ounces	185
cheese pizza	1 piece	185
veal cutlet	3 ounces	185
pork roast	3 ounces	175
beef liver	3 ounces	173
tuna	3 ounces	170
hot dog	1	155
haddock, fried	3 ounces	140
pork chop, lean	3 ounces	135
chicken, baked, no skin	3 ounces	115
shrimp	3 ounces	100
peanut butter	1 tablespoon	95
egg	1	80
bologna	2 slices	80

Food	Amount	Calories
Vitamin A Fruits and Vegetables		
peaches, sliced, sirup	1 cup	225
apricots, canned	1 cup	220
plums, canned	1 cup	220
sweet potatoes, boiled	1	170
winter squash	1 cup	130
watermelon	2 cups	110
apricots, dried	1/4 cup	98
vegetable-beef soup	1 cup	80
papaya	1 cup	70
collards	1 cup	55
brussels sprouts	1 cup	55
apricots, raw	3	50
tomatoes, canned	1 cup	50
cantaloupe	1/2 melon	50
carrots, cooked	1 cup	45
tomato juice	1 cup	44
broccoli	1 cup	40
spinach	1 cup	40
carrots, raw	1 cup	20
Vitamin C Fruits and Vegetables		
cranberry juice cocktail	1 cup	165
broccoli	1 cup	140
tangerine juice	1 cup	125
orange juice	1 cup	120
grapefruit juice	1 cup	95
papaya	1 cup	70
orange	1 medium	65
cantaloupe	1/2 melon	60
collards	1 cup	55
brussels sprouts	1 cup	55
strawberries, raw	1 cup	55
grapefruit	1/2	45
tomato	1 medium	40
spinach	1 cup	40
cabbage, cooked	1 cup	30
cauliflower, cooked	1 cup	25
cabbage, raw	1 cup	20
green pepper, raw	1/2	8
lemon	1/4	5

Food	Amount	Calories
Other Fruits and Vegetables		
rhubarb, cooked, sweetened	1 cup	385
applesauce	1 cup	230
plums, canned	1 cup	205
prune juice	1 cup	200
peaches, canned	1 cup	200
pears, canned, sirup	1 cup	195
fruit cocktail, canned	1 cup	195
pineapple, canned	1 cup	195
avocado	1/2	190
lima beans	1 cup	180
corn	1 cup	170
grape juice	1 cup	135
pineapple juice	1 cup	135
apple juice	1 cup	120
raisins	1/4 cup	120
green peas	1 cup	115
watermelon	1 wedge	115
banana	1	100
pear	1	100
potato, baked	1 medium	90
blueberries	1 cup	85
pineapple, raw	1 cup	75
prune, uncooked	4	70
raspberries	1 cup	70
apple	1 medium	70
grapes	1 cup	65
beets	1 cup	55
tangerine	1 medium	40
peach	1 medium	35
bean sprouts	1 cup	35
asparagus	1 cup	30
green beans	1 cup	30
summer squash	1 cup	30
plum	1 medium	25
mushrooms	1/4 cup	10
lettuce	1/8 head	8
cucumbers	6 slices	5
celery	1 stalk	5

Food	Amount	Calories
Breads and Cereals		
Danish pastry	1	275
rice	1 cup	225
waffle	1	205
noodles	1 cup	200
bagel	1	165
macaroni	1 cup	155
hard roll	1	155
spaghetti	1 cup	155
oatmeal	1 cup	130
grits	1 cup	125
doughnut	1	125
muffin	1	120
farina	1 cup	105
bran flakes	1 cup	105
biscuit	1	105
corn flakes	1 cup	100
Italian bread	1 slice	78
white bread	1 slice	70
whole-wheat bread	1 slice	65
rye bread	1 slice	60
pancake	1	60
crackers	4 saltines	50
French bread	1 slice (1/2 oz)	41
Miscellaneous Foods		
oil (all types)	1 tablespoon	125
cream cheese	2 tablespoons	107
mayonnaise	1 tablespoon	100
bacon	2 slices	86
Russian dressing	1 tablespoon	80
blue-cheese dressing	1 tablespoon	75
French dressing	1 tablespoon	65
whipped cream	2 tablespoons	55
margarine	1 teaspoon	35
butter	1 teaspoon	35
tartar sauce	1 tablespoon	34
half-and-half	1 tablespoon	22
sour cream	1 tablespoon	20

[a] From Brown, J.E. Nutrition for Your Pregnancy. The University of Minnesota Guide University of Minnesota Press, Minneapolis, 1983

Sample Menu Plans for Pregnancy

Breakfast

raisin bran, 1 cup
banana, 1
skim milk, 1 cup

Lunch

turkey, 4 ounces
on cracked wheat bread, 2 slices
with lettuce, 1 large leaf,
tomato, 3 slices
and mayonnaise, 1 tablespoon
potato chips, 10
skim milk, 1 cup

Dinner

chili, 1 1/2 cups
with grated cheddar cheese, 2 tablespoons
whole wheat crackers, 8
pineapple chunks, 1/2 cup
skim milk, 1 cup

Snack

Mars bar, 1
orange, 1
pumpkin pie, 1 piece
cranberry juice, 6 ounces

Nutrient Analysis

Nutrient	Amount	% of 1989 RDA*
Calories	2580 kcal	103
Protein	127 g	212
Calcium	1580 mg	132
Iron	20 mg	67
Zinc, mg	21 mg	140
Vitamin A	1578 RE	197
Thiamin	1.5 mg	100
Riboflavin	2.8 mg	175
Niacin	31 mg	182
Vitamin B_6	2.9 mg	120
Vitamin C	206 mg	294

*Percent RDA for pregnancy

Sample Menu Plans for Pregnancy (example of Southern foods)

Breakfast

fried egg, 1
grits, 1/2 cup
cornbread, 1 piece with 1 teaspoon butter
and 1 teaspoon honey

Lunch

ham, 2 ounces
cheddar cheese, 1 ounce
whole wheat bread, 1 slice
baked beans, 3/4 cup
asparagus, 1/2 cup
plum, 1

Dinner

baked chicken, 2 pieces
rice, 1 cup
blackeyed peas, 1/2 cup
sweet potatoes, 1/2 cup
collard greens, 1/2 cup
skim milk, 1 cup

Snack

ice cream, 1 cup
dried apricots, 4
wheaties, 1 cup
skim milk, 1 cup

Nutrient Analysis

Nutrient	Amount	% of 1989 RDA*
Calories	2660 kcal	106
Protein	146 g	243
Calcium	1670 mg	139
Iron	73 mg	73
Zinc	18 mg	120
Vitamin A	4120 RE	515
Thiamin	2.7 mg	180
Riboflavin	3.3 mg	206
Niacin	37 mg	218
Vitamin B_6	136 mg	136
Vitamin C	223 mg	319

*Percent RDA for pregnancy

Sample Menu Plans for Pregnancy

Breakfast

Total cereal, 1 cup
strawberries, 3/4 cup
skim milk, 1 cup

Lunch

Big Mac, 1
french fries, 1/2 small order
milk shake, 12 ounces

Dinner

beef stew, 1 1/2 cup
wheat bread, 2 slices
lima beans, 1/2 cup
watermelon, 1 cup
skim milk, 1 cup

Snack

vegetables, 1 cup (carrots, green peppers)
yogurt dip, 1/2 cup
chicken leg, 2 ounces
root beer, 1 cup

Nutrient Analysis

Nutrient	Amount	% of 1989 RDA*
Calories	2530 kcal	101
Protein	121 g	202
Calcium	1650 mg	138
Iron	34 mg	113
Zinc	15 mg	100
Vitamin A	3820 RE	478
Thiamin	3.0 mg	200
Riboflavin	4.4 mg	275
Niacin	47 mg	276
Vitamin B_6	4.3 mg	
Vitamin C	320 mg	457%

*Percent RDA for pregnancy

Sample Menu Plans for Pregnancy (Vegetarian)

Breakfast

oatmeal, 1 cup
skim milk, 1 cup
banana, 1
whole wheat toast, 1 slice with
peanut butter, 2 teaspoons

Lunch

vegeburger, 4 ounces on bun
(with mustard, 1 slice tomato, lettuce and
1 slice avocado)
baked beans, 1/2 cup
watermelon, 1 cup
skim milk, 1 cup

Dinner

tofu stir fry
(tofu, 3 ounces, bok choy, 1/4 cup, broccoli, 1/4 cup)
carrots 1/4 cup, collards, 1/4 cup)
brown rice, 1 cup
skim milk, 1 cup
oatmeal cookies, 2

Snack

hummus (chick pea spread), 1/4 cup
pita bread, 1 piece
raisins, 1/4 cup
vegetarian chili, 1 cup

Nutrient Analysis

Nutrient	Amount	% of 1989 RDA*
Calories	2570 kcal	103
Protein	122 g	203
Calcium	1740 mg	145
Iron	23 mg	77
Zinc	17 mg	133
Vitamin A	2220 RE	278
Thiamin	2.3 mg	153
Riboflavin	2.7 mg	169
Niacin	28 mg	165
Vitamin B_6	2.4 mg	109
Vitamin C	120 mg	171

*Percent RDA for pregnancy

Sample Menu Plans for Pregnancy (example of some Native-American foods)

Breakfast

cornflakes, 1 cup
strawberries, 1/2 cup
egg, 1
skim milk, 1 cup
orange juice, 1/2 cup

Lunch

tuna noodle casserole, 1 cup
carrots, 1/2 cup
lima beans, 1 cup
whole wheat bread, 1 slice
butter, 1 teaspoon.
skim milk, 1 cup

Dinner

venison, 4 ounces
mashed potatoes, 1 cup
gravy, 2 tablespoons
creamed corn, 1/2 cup
fried bread, 1 piece
skim milk, 1 cup

Snack

peanuts, 1/4 cup
raisins, 1/4 cup
banana, 1
1 cup chili

Nutrient Analysis

Nutrient	Amount	% of 1989 RDA*
Calories	2650 kcal	106
Protein	146 g	243
Calcium	1510 mg	126
Iron	26 mg	87
Zinc	16 mg	107
Vitamin A	2460 RE	308
Thiamin	2.6 mg	173
Riboflavin	3.5 mg	219
Niacin	38 mg	224
Vitamin B_6	3.4 mg	155
Vitamin C	200 mg	286

*Percent RDA for pregnancy

Sample Menu Plans for Pregnancy (example of some Mexican-American food)

Breakfast

egg, 1 with 1 tablespoon chili sauce
1 corn tortilla
cantaloupe, 1/2 cup
orange juice, 6 ounces
skim milk, 1/2 cup

Lunch

beef taco, 1 (1 tortilla with 2 ounces beef, lettuce, tomato and 1 ounce American cheese)
refried beans, 1/2 cup
spanish rice, 1/2 cup
skim milk, 1 cup

Dinner

arroz con pollo (4 ounces chicken, 1 cup rice)
squash, 3/4 cup
peas 1/2 cup
skim milk, 1 cup

Snack

1 ounce cheese
whole wheat crackers, 4
1/2 cup dried apricots
raisin bran, 1 cup
skim milk, 1 cup

Nutrient Analysis

Nutrient	Amount	% of 1989 RDA*
Calories	2430 kcal	97
Protein	135 g	225
Calcium	1870 mg	156
Iron	26 mg	87
Zinc	21 mg	140
Vitamin A	5800 RE	725
Thiamin	2.4 mg	160
Riboflavin	3.3 mg	206
Niacin	34 mg	200
Vitamin B_6	2.9 mg	132
Vitamin C	286 mg	409

*Percent RDA for pregnancy

Appendix B

NUTRITION ASSESSMENT FORMS

ANTHROPOMETRIC REFERENCE DATA

Table B1. Adolescent Prenatal Nutrition Screening Form

I.D. No.
Date:

Please answer the following questions. This information will help us to provide you with the best nutritional care. All information is confidential.

General Information

Full Name _____ Name you would like to be called _____

Birthday _____ Age _____

Are you in school? Yes ❑ No ❑

What school do you go to? _____

Do you have a job? Yes ❑ No ❑

Who do you live with? (Check all that apply to you.) Boyfriend/Husband ❑ Children ❑

Relatives ❑ Boyfriend's Parents ❑ Other (please write in) _____

Past Health History

Have you ever had any of the following? (Check all that apply.)

Allergy/asthma _____ High blood pressure _____

Anemia _____ Intestinal problems _____

Anorexia/Bulimia _____ Kidney disease _____

Cancer _____ Liver disease _____

Diabetes _____ Tuberculosis _____

Heart disease _____ Other _____

Past Pregnancy History

If you have been pregnant before, how much weight did you gain during your last pregnancy?

_____ Pounds _____ Don't know

Do you have any children? Yes ❑ No ❑

Current Health History

Do you take a vitamin or mineral supplement?	Yes ❑	No ❑
Are you currently taking any other medications for drugs?	Yes ❑	No ❑
Do you smoke cigarettes?	Yes ❑	No ❑
Do you exercise more than 3 times a week?	Yes ❑	No ❑

Have you had any of the following with this pregnancy?

	A lot	Some	None
Nausea	_____	_____	_____
Vomiting	_____	_____	_____
Constipation	_____	_____	_____
Diarrhea	_____	_____	_____
Heartburn	_____	_____	_____
Leg cramps	_____	_____	_____
Increased appetite	_____	_____	_____
Decreased appetite	_____	_____	_____

Food Frequency

How often to you eat the following foods? (Put an "X" on the line.)

	Every day or nearly every day	Sometimes (not daily but at least once a week)	Never or hardly ever (less than once a week)
Milk	_____	_____	_____
Cheese, yogurt	_____	_____	_____
Ice cream	_____	_____	_____
Peanut butter or nuts	_____	_____	_____
Meat, fish, chicken	_____	_____	_____
Eggs	_____	_____	_____
Bread, rice, cereal, potatoes	_____	_____	_____
Fruit or fruit juices	_____	_____	_____
Vegetables	_____	_____	_____
Sweets (cakes, donuts, pies, cookies, candy)	_____	_____	_____
Potato chips, corn chips, pretzels, etc.	_____	_____	_____
Soda pop, Kool-Aid	_____	_____	_____
Alcohol (beer, wine, etc.)	_____	_____	_____
Coffee, tea	_____	_____	_____
Eat at fast food restaurants?	_____	_____	_____

What are your favorite foods?

What foods do you dislike the most? _____

What are your most common snack foods or beverage? _____

Do you crave anything? Yes ❑ No ❑

If yes, what? _____

Eating Habits

During your pregnancy, have you wanted to eat any of the following? (Check Yes or No.)

	Yes	No		Yes	No
Ice/freezer frost	❑	❑	Dirt or clay	❑	❑
Cornstarch	❑	❑	Plaster	❑	❑
Laundry starch	❑	❑	Other _____		

How often do you usually eat meals or snacks? (Put an "X" on the line.)

	Every day or nearly every day	Sometimes (not daily but at least once a week)	Never or hardly ever (less than once a week)
Breakfast	_____	_____	_____
Lunch	_____	_____	_____
Evening meal	_____	_____	_____
Morning snack	_____	_____	_____
Afternoon snack	_____	_____	_____
Evening snack	_____	_____	_____

Do you have a stove, refrigerator, and oven that works? Yes ❑ No ❑

Who does the following where you live? (Put an "X" on the line.)

	Yourself	Others	No one
Plans most of the meals	_____	_____	_____
Buys most of the food	_____	_____	_____
Prepares most of the food	_____	_____	_____

Are there times during the month when you don't have enough food to eat? Yes ❑ No ❑

Do you receive any of the following? (Check all that apply to you.)

Food Stamps _____ WIC Food Program _____

AFDC/Welfare _____ Medical Assistance (M.A.) _____

Free or reduced priced school meals _____ Food from food shelves _____

Other _____

Do you have any questions or concerns about nutrition or what you eat?

_____

_____

_____

Thank you for filling this out.

Developed by the Adolescent Health Program Nutrition Staff
University of Minnesota

Table B2. 24 Hour Food Recall

NAME _____
AGE _____
DATE _____

"I would like to know what you've eaten within the past 24 hours. Could you please tell me everything you ate or drank, including meals, snacks, beverages, candy and alcohol? Why don't you start with the last thing you've had to eat or drink today and we'll go backwards."

Time:	Place:	Food or Beverage Consumed:	Amount:	Dairy Products	Meat or Substitute	Vitamin C Source	Vitamin A Source	Other Fruits and Vegetables	Whole or Enriched Grain Products	Fats and Oils	Sweets
				This Side For Office Use							
			Minimum Recommended Number of servings/day for pregnant teens	4-5	3-4	2	1	2	5-6	2	As needed
Is this a typical day? _____			Total Number of Servings								

Nutrients diet may be lacking in: _____

_____

Nutrients diet may be excessive in: _____

_____

Table B3. Check list for collecting detailed dietary intakes.

Food Group	Did You Specify:	Did you Probe for Additions and Amounts of:
Beverages		
Carbonated Beverages	Cola or non-cola, caffeine-free diet	
Coffee, Tea	Brewed, instant, decaf, herbal	Sweetener, whitener, cream
Cocoa	Mix (regular, sugar-free or low-cal) Milk (% fat)	Marshmallows Whipped topping
Beer	Regular, light or low alcohol	
Liquor, Mixed Drinks, Liqueur	Name of mixed drink, liqueur Proportion of ice	Mix (juice, other non-alcoholic beverage)
Wine	Dinner or dessert	
Fruit Drinks	Type, kind	
Dairy Products		
Milk	Type (% fat)	
Cheese	Natural or processed Kind (Cheddar, Swiss, etc.)	
Yogurt	Plain or flavored, % fat	Fruits, nuts, etc.
Ice Cream, Ice Milk	Flavor Topping	Rich or average fat
Milk Shakes, Malts	Homemade or restaurant Flavor Ice cream or ice milk	
Desserts, Baked Goods		
Cookies	Kind, brand	
Cakes	Kind Layer, sheet or cupcake	Frosting, filling, topping
Pies	Kind (filling) Single or double crust	Topping
Gelatin Desserts	Low-cal or regular	Topping, other additions (fruit, etc.)
Fruits/Fruit Juices	Fresh, canned or dried	
Grain Products		
Bread, Rolls	Kind (white, whole wheat, rye, etc.)	Butter, margarine, other spread
French Toast	Kind of bread	Butter, margarine, syrup, etc.
Sweet Rolls	Yeast or cake-type	Frosting, glaze, nuts, preserves
Pancakes, Waffles Biscuits, Muffins	Kind (whole wheat, buckwheat, bran, etc.)	Butter, margarine, syrup, etc.

Table B3. Check list for collecting detailed dietary intakes.—Page 2

Food Group	Did You Specify:	Did you Probe for Additions and Amounts of:
Meat, Poultry, Fish		
Meat	Kind, cut Method of preparation (baked, fried, etc.) Trimmed or untrimmed With or without bone Was fat eaten?	Sauce, gravy, etc.
Poultry	Light or dark meat (or name of part) Prepared with or without skin Skin eaten or not Breaded or battered and fried With or without bone	Sauce, gravy, etc.
Fish	Kind Breaded or battered and fried Fresh or canned If canned, water or oil pack	Sauce, etc.
Cold Cuts, Luncheon Meats	Kind, brand	
Mixed Dishes	Main ingredients Meat, kind Sauce or gravy Milk or cheese Pasta or vegetables	Topping (e.g., croutons, crackers, cheese, etc.)
Pizza	Thick or thin crust	Topping
Sandwiches	Kind of filling Type of bread, bun, roll	Spread (mayonnaise or butter/margarine
Soups	Kind; homemade or commercial Ready to serve Milk or cream added Chunky or regular	Croutons, crackers, cheese, etc.
Vegetables	Cooked or raw Fresh, frozen or canned Method of preparation: boiled, fried, creamed, baked	Fat (kind), cheese sauce, nuts, dip, etc.
Salads	Kind, (major vegetables)	Dressing, kind and/or brand Croutons, seeds, etc.
Baked Potato	Skin eaten or not	Butter, sour cream, etc.
French Fries	Frozen, scratch Fat in preparation (kind)	Catsup

Source: Nutrition Coordinating Center
University of Minnesota
Minneapolis, MN

Table B4. Food Frequency Form

How often do you eat the following foods?

	More than once/day	Once/ day	2-3 times/ week	Seldom	Never
Milk					
Cheese, yogurt					
Ice cream					
Meat, fish, poultry					
Eggs					
Peanut butter, nuts					
Dry beans, peas					
Citrus fruits, juice (i.e. orange, grapefruit, tomato)					
Dark green leafy or deep orange vegetables (i.e., collards, broccoli, carrots, squash, sweet potatoes)					
Other fruits, vegetables, potatoes					
Bread, cereals, rice, pasta					
Sweets (cakes, donuts, pies, cookies, candy)					
Salty snacks: potato chips, corn chips, tortilla chips, etc.					
Soda pop, Kool-Aid					
Alcohol (beer, wine, etc.)					
Coffee, tea					
Vitamins, other supplements					

Table B5. Nutritional Evaluation Sheet for Pregnant Teenagers

How Balanced Is My Diet for Pregnancy?

Food Group	Size of Standard Serving	Major Nutrient Contributions	Minimum Recommended No. of Servings	Servings Eaten	Servings Lacking
1. DAIRY PRODUCTS					
milk	1 cup	Protein (complete	4-5		
yogurt	1 cup	high biological			
cheese	1-1/2 oz.	value); calcium			
cottage cheese	1 cup	phosphorus, magnesium, vitamin D, riboflavin			
2. MEAT AND MEAT ALTERNATES					
meat	3 oz.	Protein, B complex	3-4		
fish	3 oz.	vitamins, iron, zinc			
poultry	3 oz.				
dried beans	1 cup				
eggs	2				
peanut butter	4 Tbsp.				
peanuts, other nuts	1/2 cup or 3 oz.				
3. VITAMIN A VEGETABLES AND FRUITS					
broccoli	1/2 cup	Vitamin A, folic acid	1		
carrots	1/2 cup				
collards	1/2 cup				
green peppers	1/2 cup				
spinach	1/2 cup				
sweet potatoes	1/2 cup				
winter squash	1/2 cup				
papaya	1 cup				
cantaloupe	1/4 melon				
plums	1 cup				
apricots	3				
4. VITAMIN C FRUITS AND VEGETABLES					
cantaloupe	1 cup or 1/4 melon	Vitamin C, folic acid	2		
oranges/orange juice	1 or 6 oz.				
grapefruit/juice	1 or 6 oz.				
tomatoes/juice	1 or 1 cup				
strawberries	2/3 cup				
watermelon	1/2 cup				
papaya	1/2 cup				
broccoli	1/2 cup				
raw cabbage	1 cup				
green pepper	1/2 cup				
brussels sprouts	1/2 cup				

Table B5. Nutritional Evaluation Sheet for Pregnant Teenagers—Page 2

How Balanced Is My Diet for Pregnancy?

Food Group	Size of Standard Serving	Major Nutrient Contributions	Minimum Recommended No. of Servings	Servings Eaten	Servings Lacking
5. OTHER FRUITS AND VEGETABLES					
banana	1	Energy, fiber	2		
apples/juice	1 or 6 oz.				
pears	1				
peaches	1				
grapes/juice	1/2 cup or 6 oz.				
potatoes	1 small or 1/2 cup				
corn	1/2 cup				
peas	1/2 cup				
beets	1/2 cup				
green beans	1/2 cup				
6. BREADS AND CEREALS					
bread	1 slice	Protein (incomplete)	5-6		
roll, biscuit, or		B complex vitamins			
muffin	1				
tortilla	1				
ready-to-eat					
cereal	3/4 cup				
pasta	3/4 cup				
rice	3/4 cup				
7. FATS					
butter, margarine	1 tsp.	Vitamin A (butter,	2		
salad dressing	2 Tbsp.	fortified margarine);			
sour cream	1 Tbsp.	vitamin E (vegetable			
cream cheese	1 Tbsp.	oils); energy			
mayonnaise	2 tsp.				

Table B6. Selected smoothed percentiles for subscapular skinfold of females ages 12-18 years: United States, 1963-65, 1966-70, and 1971-74.

	Smoothed percentile						
	5th	10th	25th	50th	75th	90th	95th
	Subscapular skinfold in millimeters						
12.0 years	4.5	4.8	5.9	7.7	11.5	18.6	23.2
12.5 years	4.6	5.1	6.2	8.1	12.1	19.3	24.1
13.0 years	4.8	5.3	6.4	8.4	12.6	20.1	25.0
13.5 years	5.0	5.5	6.7	8.8	13.2	20.8	25.8
14.0 years	5.2	5.7	7.0	9.2	13.8	21.5	26.6
14.5 years	5.4	5.9	7.2	9.5	14.3	22.1	27.4
15.0 years	5.5	6.2	7.4	9.9	14.8	22.7	28.1
15.5 years	5.7	6.3	7.7	10.2	15.4	23.2	28.7
16.0 years	5.8	6.5	7.9	10.6	15.8	23.7	29.2
16.5 years	6.0	6.7	8.1	10.9	16.3	24.2	29.7
17.0 years	6.1	6.8	8.2	11.2	16.7	24.6	30.1
17.5 years	6.2	7.0	8.4	11.5	17.1	24.9	30.4
18.0 years	6.3	7.0	8.5	11.7	17.5	25.1	30.6

Source: Basic Data on Anthropometric measurements and angular measurements of the hip and knee joints for selected age group 1-74 years of age. U.S. 1971-75. DHHS publication no (PHS) 81-1669. Series 11, number 219, 1981.

Table B7. Selected smoothed percentiles for triceps skinfold of females ages 12-18 years: United States, 1963-65, 1966-70, and 1971-74.

	Smoothed percentile						
	5th	10th	25th	50th	75th	90th	95th
	Triceps skinfold in millimeters						
12.0 years	6.6	7.6	9.5	12.6	16.9	22.2	25.6
12.5 years	6.7	7.8	9.8	12.9	17.5	22.8	26.2
13.0 years	6.9	8.0	10.1	13.3	18.0	23.3	26.8
13.5 years	7.1	8.3	10.4	13.7	18.5	23.8	27.4
14.0 years	7.3	8.5	10.7	14.1	19.0	24.2	28.0
14.5 years	7.5	8.8	11.1	14.5	19.5	24.7	28.5
15.0 years	7.7	9.1	11.4	14.8	20.0	25.1	29.0
15.5 years	7.9	9.3	11.8	15.2	20.5	25.5	29.4
16.0 years	8.0	9.6	12.2	15.6	20.9	25.9	29.8
16.5 years	8.2	9.8	12.5	16.0	21.3	26.3	30.1
17.0 years	8.4	10.0	12.8	16.3	21.7	26.7	30.4
17.5 years	8.5	10.2	13.2	16.6	22.0	27.0	30.7
18.0 years	8.6	10.4	13.5	17.0	22.2	27.3	30.9

Source: Basic Data on Anthropometric measurements and angular measurements of the hip and knee joints for selected age group 1-74 years of age. U.S. 1971-75. DHHS publication no (PHS) 81-1669. Series 11, number 219, 1981.

Table B8. Selected smoothed percentiles for upper arm girth of females ages 12-18 years: United States, 1963-65, 1966-70, and 1971-74.

	Smoothed percentile						
	5th	10th	25th	50th	75th	90th	95th
	Upper arm girth in centimeters						
12.0 years	18.6	19.3	20.6	22.3	24.5	27.1	28.8
12.5 years	19.0	19.7	21.1	22.8	25.1	27.7	29.5
13.0 years	19.4	20.1	21.6	23.3	25.6	28.3	30.2
13.5 years	19.9	20.5	22.0	23.8	26.2	28.8	30.8
14.0 years	20.3	20.9	22.4	24.2	26.6	29.3	31.4
14.5 years	20.6	21.3	22.8	24.6	27.1	29.8	31.9
15.0 years	21.0	21.7	23.2	25.0	27.5	30.2	32.4
15.5 years	21.3	22.0	23.5	25.4	27.8	30.6	32.8
16.0 years	21.6	22.3	23.8	25.6	28.1	30.9	33.2
16.5 years	21.8	22.5	24.0	25.9	28.3	31.2	33.4
17.0 years	22.0	22.7	24.2	26.0	28.5	31.4	33.6
17.5 years	22.1	22.8	24.2	26.1	28.6	31.5	33.7
18.0 years	22.1	22.9	24.2	26.2	28.5	31.6	33.7

Source: Basic Data on Anthropometric measurements and angular measurements of the hip and knee joints for selected age groups 1-74 years of age. U. S. 1971-75. DHHS publication no (PHS) 81-1669. Series 11, number 219, 1981.

Table B9. Upper arm fat and muscle area standards (percentiles for estimates of upper arm fat area [mm^2] and upper arm muscle are [mm^2] for whites of the United States Health Examination Survey I of 1971 to 1974).

Age	Arm Muscle Area Percentile (mm^2)						
Group	5	10	25	50	75	90	95
Females							
12-12.9	2092	2182	2579	2904	3225	3655	3847
13-13.9	2269	2426	2657	3130	3529	4081	4568
14-14.9	2418	2562	2874	3220	3704	4294	4850
15-15.9	2426	2518	2847	3248	3689	4123	4756
16-16.9	2308	2567	2865	3248	3718	4353	4946
17-17.9	2442	2674	2996	3336	3883	4552	5251
Age	Arm Fat Area Percentiles (mm^2)						
Group	5	10	25	50	75	90	95
Females							
12-12.9	782	854	1090	1511	2056	2666	3369
13-13.9	726	838	1219	1625	2374	3272	4150
14-14.9	981	1043	1423	1818	2403	3250	3765
15-15.9	839	1126	1396	1886	2544	3093	4125
16-16.9	1126	1351	1663	2006	2598	3374	4236
17-17.9	1042	1267	1463	2104	2977	3864	5159

From: Frisancho, A.R. Am. J. Clin. Nutr. 34:2540, 1981.

Calculating muscle and fat areas

The upper arm area, upper arm muscle and fat areas can be calculated from midarm circumference (in mm) and triceps skinfold (in mm) measurements using the following formulas:

- arm area (mm^2) = $\frac{\pi \times d^2}{4}$, where $d = \frac{C}{\pi}$

- arm muscle area (mm^2) = $\frac{(C - \pi T)^2}{4\pi}$

- arm fat area = [arm area] - [arm muscle area]

$$\text{arm fat area} = \left[\frac{\pi}{4} \times \left[\frac{C}{\pi}\right]^2\right] - \left[\frac{(C - \pi T)^2}{4\pi}\right]$$

where C = midarm circumference (mm)
T = triceps skinfold (mm)

From: Frisancho, A.R. Am. J. Clin. Nutr. 34:2540, 1981 and
Frisancho, A.R. Am. J. Clin. Nutr. 27:1052, 1974.

Appendix C

LIFESTYLE HEALTH ASSESSMENT

Exercise	Before	Now
1. How often did/do you exercise before you were pregnant/now that you are pregnant? (Walking, biking, running, school sports, aerobics, etc.)		
3 or more times/week	_____	_____
less than 3 times/week	_____	_____
2. How long did/do you exercise?		
less than 20 minutes	_____	_____
20 - 30 minutes	_____	_____
35 - 60 minutes	_____	_____
3. What kinds of exercise did/do you do most often?		
School sports (competitive)	_____	_____
Other sports (recreational)	_____	_____
Gym classes	_____	_____
Cheerleading	_____	_____
Aerobics/exercise classes	_____	_____
Dancing	_____	_____
Weight lifting/body building	_____	_____
Other _____	_____	_____
4. How often did/do you breathe hard and feel "out of breath" when you exercise?		
Usually	_____	_____
Sometimes	_____	_____
Hardly ever	_____	_____

Drug Use OTC/Prescription						
	Before Pregnancy		Early Pregnancy (First 8 weeks)		Now	
	Frequency	Amount	Frequency	Amount	Frequency	Amount
Aspirin						
Tylenol						
Birth Control Pills						
Diet Pills						
Pills for Acne						
Antibiotics						
Cold/cough medicines						
Allergy medicines						
Laxatives						
Nausea medicines						
Seizure medicines						
Vitamins						
Caffeine (coffee, tea, colas, Mountain Dew)						

Drug Use						
	Cigarettes	Alcohol (beer, wine coolers) "hard liquor"	Marijuana (pot, joint, grass, hash, reefer, weed)	Amphetamine (speed uppers, white crosses, pink hearts, ice)	Methamphet-amines (crystal, crank)	Cocaine (lady, snow, rock, base, crack)
How often did/do you use?						
Before pregnancy						
Early pregnancy						
Now						
How much did/do you usually use?						
Before pregnancy						
Early pregnancy						
Now						
Have you/do you ever use more?						
How much?						
How often do you get high, feel out of control or black out?						
How do you use? (Snort, free-base, shoot up, etc.)						
How old were you when you first started to use?						
Number of years used?						
Why do you use?						
Have you ever cut down or quit?						
Why?						
Have you ever had treat-ment?						
What are your plans for using during preg-nancy?						
What helps, problems do you expect?						
What drugs do you use together?						
How often?						

Drug Use (Continued)							
	Depressants (downers, reds, barbiturates, tranquilizers, sleeping pills)	Inhalants (glue, white-out, gasoline, aerosal sprays)	Hallucinogens (LSD, mush-rooms, acid, PCP's, angel dust)	Heroin (junk, dope, chaina white)	Opium	Methadone	Other
How often did/do you use? Before pregnancy Early pregnancy Now							
How much did/do you usually use? Before pregnancy Early pregnancy Now							
Have you/do you ever use more? How much?							
How often do you get high, feel out of control or black out?							
How do you use? (Snort, free-base, shoot up, etc.)							
How old were you when you first started to use? Number of years used?							
Why do you use?							
Have you ever cut down or quit? Why?							
Have you ever had treatment?							
What are your plans for using during pregnancy?							
What helps, problems do you expect?							
What drugs do you use together? How Often?							

Modified from Reference 7

Habits That May Affect My Baby							
Day	Am I?	Yes	No	What Kind	How Much?	Have I Cut Down?	Am I Trying?
Monday	Smoking Drinking Doing Drugs						
Tuesday	Smoking Drinking Doing Drugs						
Wednesday	Smoking Drinking Doing Drugs						
Thursday	Smoking Drinking Doing Drugs						
Friday	Smoking Drinking Doing Drugs						
Saturday	Smoking Drinking Doing Drugs						
Sunday	Smoking Drinking Doing Drugs						

This questionnaire will help you understand why you smoke and how smoking affects you. Check either "Yes" or "No" to each question.

	Yes	No
1. Is it very hard for you to go a half-day without smoking?	_____	_____
2. Do you have a strong craving for cigarettes?	_____	_____
3. Do you feel a need to smoke a certain number of cigarettes each day?	_____	_____
4. Do you smoke even when you are feeling sick?	_____	_____
5. Do you often find yourself smoking a cigarette when you weren't aware of lighting one up?	_____	_____
6. Do you smoke when you talk on the phone, watch TV, etc.?	_____	_____
7. Do you ever go a whole day without smoking?	_____	_____
8. Do you smoke more when you are angry with someone?	_____	_____
9. Is smoking one of your most important pleasures in life?	_____	_____
10. Does the thought of never smoking again make you feel sad?	_____	_____

Questions 1-4 show chemical addiction

If you answered 2 out of 4 questions "Yes", you are chemically addicted to cigarettes. Nicotine is an addictive substance. If you crave cigarettes and cannot go a few hours without smoking, you probably are addicted to nicotine.

- Stop cold turkey.
- Your first few days off cigarettes will be the hardest. After that, it will be easier.
- Use some of the hints to make smoking harder for yourself in the first few days.
- Nicotine chewing gum is not safe during pregnancy.

Questions 5-7 show smoking is a habit with you

- You are a person who often smokes while doing other things — talking on the phone or watching TV.
- After a few times of smoking with another activity, this activity will trigger your desire to smoke.
- Use some of the hints listed under "instead of smoking" to help you break your habit of smoking.

Questions 8-10 show psychological dependency

- Psychological dependency simply means that smoking is the way you most often manage stress.
- You may feel smoking relaxes you and helps you deal with tension in your life.
- Smoking cigarettes is a comfort and a "friend."
- Search for new ways to deal with tension or new ways to relax. Exercise and talking with someone may help you manage stress better than cigarettes.

Instead of Smoking

If cigarettes give you an energy boost, try chewing sugarless gum or taking a brisk walk instead.

Try other activities with your hands: doodle, sew, etc.

Listen to a favorite tape or record.

When you feel irritable or tense, shut your eyes and do deep breathing exercises.

Drink water, eat carrots, celery or fresh fruit.

Take a shower or a bath.

Dance.

Work on a crossword puzzle.

After a meal, brush your teeth right away.

Save Some Money

Make up a short list of things you have wanted.

Next to each write down the cost.

Now, convert the cost to "packs of cigarettes." If you save the money each day from the packs of cigarettes, you will be able to buy these things.

Keep the money saved in a special place.

Adapted from The American Cancer Society

Make Smoking Harder for Yourself

Don't store up on cigaretes. **Never Buy a Carton.** Wait until one pack is finished before you buy another.

Smoke with the "other" hand.

Put cigarettes in an inconvenient place—unusual pocket, bottom of drawer, top shelf, etc.

Never carry matches or a lighter with you.

Smoke only 1/2 of each cigarette.

Give away your ashtrays.

Change your brand of cigarettes weekly so you are always smoking a brand of lower tar and nicotine content than the week before.

Never smoke after you get a craving for a cigarette until three minutes have passed since you got the urge. During that three minutes do something different. Try calling an ex-smoker or somebody you can talk to until the craving goes away.

Each day try to put off lighting your first cigarette.

Decide that you will smoke only on even or odd-numbered hours of the clock.